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RCEME

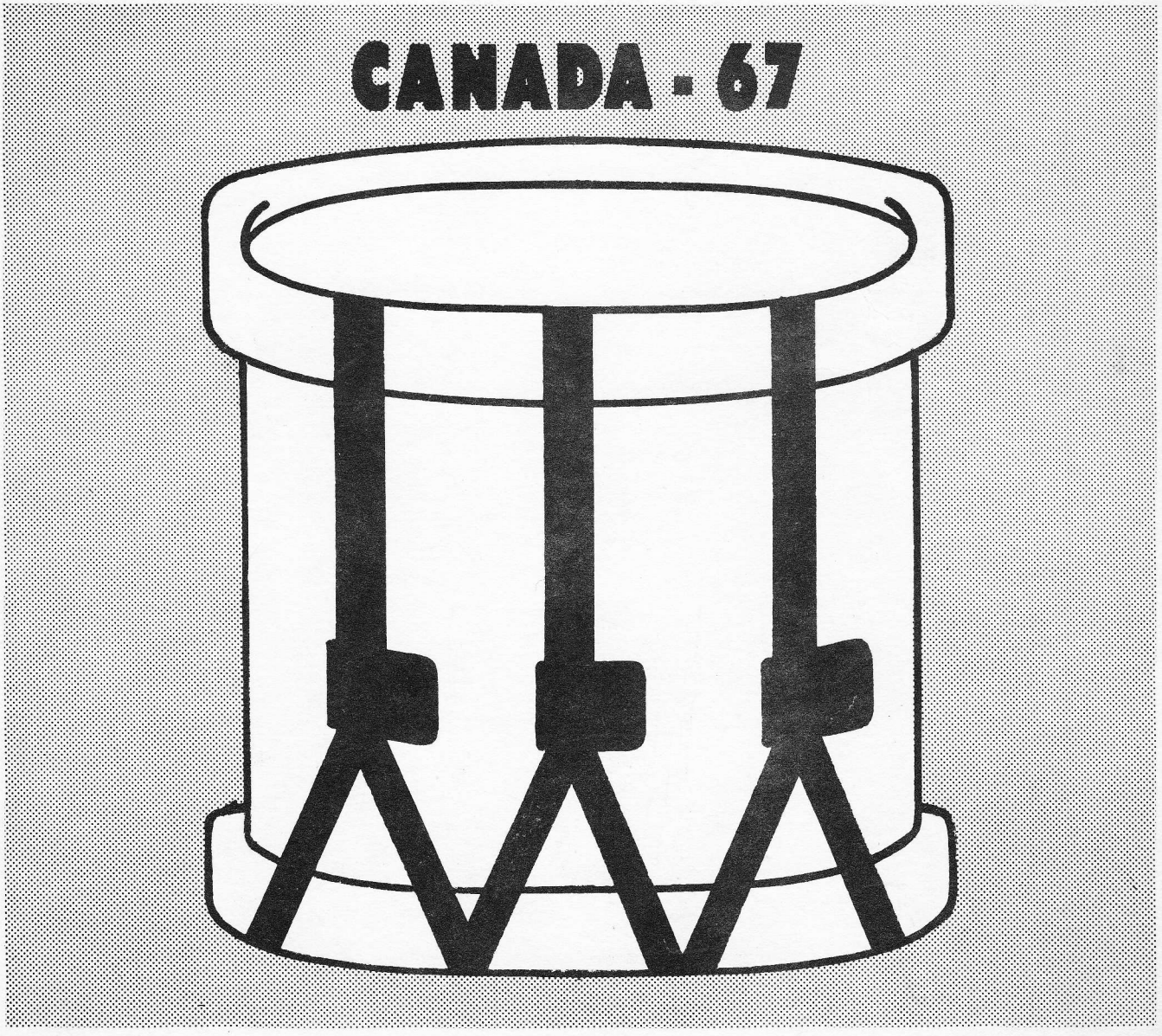
TECHNICAL BULLETIN

VOLUME 12, NUMBER 1 JANUARY 1967

CANADIAN ARMED FORCES

TATTOO

LE CARROUSEL MILITAIRE DES FORCES CANADIENNES



CANADIAN ARMED FORCES

TATTOO

WHAT IS A "TATTOO"?

In Holland at the close of the 17th century, the social centers for the troops were the inns and taverns. One method to induce the soldiers to return to their billets was to have the innkeeper turn off the beer taps. A drummer was sent marching through the streets beating a warning 'call'. The Dutch expression for this 'call' was "doe den tap toe" which freely translated into English is "shut off the taps". Shortened to "Taptoe" it became "Tattoo" through usage. As time passed, musicians joined the drummer, leading eventually to bands playing concerts for the entertainment of the garrisons. Later "Tattoos" were performed for royalty and the general public. Through period drill, music, pageantry, fantasy, sweeping spotlights, colorful and authentic uniforms and weapons featured in this production, the audience will see a history book unfold before its eyes—from the arrival of the French Regiments in Canada through the British period and other episodes of Canadian military history, to the capabilities of Canada's integrated mobile force of today, dedicated to the preservation of peace in the world.

QU'EST-CE QU'UN "TATTOO"?

En Hollande, vers la fin du 17e siècle, les troupes avaient l'habitude de passer leurs loisirs dans les auberges et les tavernes. Un des moyens utilisés pour inciter les soldats à retourner à leur cantonnement était de faire fermer les robinets de bière. Le soir un tambour battait le rappel à travers les rues. La vieille expression hollandaise pour indiquer ce rappel était "doe den tap toe" (traduction libre: "fermez les robinets"). Abrégée en "taptoe", elle devait se transformer en "tattoo". Avec le temps, des musiciens prirent l'habitude de se joindre au tambour, ce qui amena peu à peu ces groupes à jouer pour le plaisir de la garnison. Les "tattoos" furent plus tard exécutés pour la famille royale et le public en général. Un spectacle fantaisiste et animé, comportant des exercices et de la musique, fera revivre aux spectateurs, dans une atmosphère d'époque rehaussée par des jeux de lumière, plusieurs pages de notre histoire; l'arrivée en 1665 du premier régiment français au Canada, la période britannique et d'autres épisodes de l'histoire militaire canadienne ainsi que la force canadienne d'aujourd'hui.

WHERE YOU CAN SEE THE TATTOO

BARRIE, Ontario	Barrie Arena, 13 - 14 April/avril
BRANDON, Manitoba	Brandon Wheat City Arena, 2 - 3 May/mai
CALGARY, Alberta	Calgary Stampede Corral, 11 - 13 May/mai
CHARLOTTETOWN, P.E.I.	The Forum, 14 - 16 Sept./sep.
CORNER BROOK, Nfld.	Corner Brook Arena, 18 - 19 Sept./sep.
EDMONTON, Alberta	Edmonton Gardens, 11 - 13 May/mai
FORT WILLIAM, Ontario	Fort William Gardens, 2 - 3 May/mai
FREDERICTON, N.B.	Lady Beaverbrook Arena, 21 - 22 April/avril
GLACE BAY, Nova Scotia	Glace Bay Miners Forum, 11 - 12 April/avril
HALIFAX, Nova Scotia	Halifax Forum, 13 - 16 April/avril
HAMILTON, Ontario	Hamilton Forum, 7 - 9 Sept./sep.
KELOWNA, British Columbia	Kelowna & District Memorial Arena, 15 May/mai
KINGSTON, Ontario	Kingston Community Memorial Centre 2 - 3 April/avril
KITCHENER, Ontario	Kitchener Memorial Auditorium 24 - 26 April/avril
LETHBRIDGE, Alberta	Lethbridge Arena, 9 - 10 May/mai
LONDON, Ontario	London Arena, 21 - 23 April/avril
MEDICINE HAT, Alberta	Medicine Hat Arena Gardens, 8 May/mai
MONCTON, New Brunswick	Moncton Stadium, 17 - 18 April/avril
MONTREAL, Quebec	EXPO 67, 22 June/juin - 4 July/juillet
NIAGARA ON THE LAKE,	Niagara Falls, Ontario. Fort George, 10-16 July/juillet
NORTH BAY, Ontario	North Bay Community Memorial Building 27 - 28 April/avril
OTTAWA, Ontario	Central Canada Exhibition 18 - 19 August/août
PETERBOROUGH, Ontario	Peterborough Memorial Centre 31 Mar./mars - 1 April/avril
PRINCE GEORGE, B.C.	The Coliseum, 15 May/mai
QUEBEC CITY, Quebec	The Citadel, 10 - 16 July/juillet
REGINA, Saskatchewan	Regina Exhibition Stadium, 4 - 6 May/mai
SARNIA, Ontario	Sarnia Arena & Community Centre 15 - 16 April/avril
SASKATOON, Saskatchewan	Saskatoon Arena, 8 - 10 May/mai
SAULT STE. MARIE, Ontario	Sault Memorial Gardens, 29 - 30 April/avril
SHERBROOKE, Quebec	Sherbrooke Arena, 23 - 24 April/avril
SAINT JOHN, New Brunswick	Lord Beaverbrook Rink, 19 - 20 April/avril
ST. JOHN'S, Nfld.	St. John's Memorial Stadium, 21 - 23 Sept./sep.
SUDBURY, Ontario	Sudbury Arena, 27 - 30 April/avril
TROIS RIVIÈRES, Quebec	Colisée de Trois Rivières, 25 - 26 April/avril
TIMMINS, Ontario	McIntyre Community Building 29 - 30 April/avril
TORONTO, Ontario	Canadian National Exhibition 28 Aug./août - 4 Sept./sep.
VANCOUVER, B.C.	Vancouver Empire Stadium 30 May/mai - 4 June/juin
VICTORIA, B.C.	Victoria Memorial Arena, 25 - 27 May/mai
WINDSOR, Ontario	Windsor Arena, 17 - 20 April/avril
WINNIPEG, Manitoba	Winnipeg Arena, 4 - 7 May/mai

ENDROITS ET DATES

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THE CENTENNIAL COMMISSION

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RCEME TECHNICAL BULLETIN

Vol 12, No 1, Jan 1967

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This Technical Bulletin is issued under the authority of Lt Col GW Bruce, CD, A/SSO Ld Mat Maint, Materiel Command Headquarters, who has approved the contents for publication.

The Bulletin is published to assist RCEME personnel in keeping abreast of current trends in developments, to amplify or emphasize technical instructions, to circulate news of Corps and individual activities, and to provide a forum for discussion and the exchange of ideas by members of the Corps. The information and statements herein do not necessarily represent official policy and are not to be quoted as authority for action.

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PRE-GROUP 4 ASSESSMENT, SPRING 1967 EXAMINATIONS

In 1966 a new RCEME Pre-Group 4 Assessment Training Standard dated February 1966, in a grey cover, was distributed to all personnel concerned. This booklet contains all the information required by anyone planning to write any of the forthcoming examinations. It is essential reading, and if you do not have a copy, you should apply to your Platoon Commander or Orderly Room immediately.

The pre-group 4 examinations were due to be held 5-6 Dec 66 but were postponed by CFHQ to 29-30 May 67. We are now preparing to meet this latter date. To avoid any confusion, either now or in the future, these examinations will be known as the Spring 1967 Examinations. The standards contained in the booklet mentioned in above will continue to apply in all other respects.

Because there are no longer any Command EMEs, distribution of material referring to the examinations, obtaining the names of personnel who wish to write, and the establishment of writing centers is very difficult. We have, therefore, adopted a new system. We are asking each prospective candidate to complete a prepared, self-addressed, prepaid postcard showing his number, rank and name; the examinations he wishes to write; the time he has spent preparing for these examinations; and the approval of his CO. These postcards are being distributed via CFB Maintenance Officers or equivalents, and the COs of various units such as 56 Inf Wksp.

These cards will be distributed before 27 Jan 67 and must be completed and returned to the RCEME School by 15 Mar 67. Each member wishing to write the Spring 1967 Examinations must complete a card, so be sure you get one and complete it carefully and accurately.

Every effort has been made to ensure that all the necessary information has been disseminated to all members. Any enquiries concerning these examinations should be directed to The RCEME School, attention ACI (Trg).

Centennial Year Message from the Head of Corps

I want to take this opportunity to extend to all ranks of the Corps of RCEME and their families my very best wishes for a happy and satisfying year during 1967.

The year just ended has been one of the more interesting ones in recent years for those of us in the Army. Integration of the Forces has progressed to a degree that has directly affected most of us, and we have been forced to examine closely many of the ideas and procedures to which we adhered in the past. Despite the many organizational changes that have taken place, the Corps of RCEME is continuing to perform its traditional role and, in fact, is assuming a few additional tasks. The strength of the Corps remains high with the training load at the School greater than it has been for many years.

During 1966 a large number of our wartime associates retired from the Army after many years of service. We bid them farewell and God speed and hope that they will enjoy whatever they undertake in the future, be it a new job or complete retirement. However, the Army is a continuing viable organization, and when someone leaves another is promoted to take his place. Thus, during 1966, a great many RCEME officers, warrant officers, senior NCOs and men were promoted. This is as it should be. All are to be congratulated.

The Centennial year ahead promises, if anything, to be more interesting and challenging than any in the recent past. Integration will proceed at an ever increasing rate. The Canadian Forces Reorganization Act has been introduced into the House of Commons and will be considered during 1967. RCEME personnel will continue to serve in all parts of the world where the Canadian Army has commitments. We will continue to adjust to the new rank/trade/pay structure. The revised trade specifications will be introduced and the necessary

Colonel AL Maclean, CD

course training standards will be developed. No doubt some changes in our present way of qualifying will be introduced. Announcements of new equipment for the Forces will ultimately mean a further challenge for those of us in RCEME. Many will be involved in the various Centennial celebrations.

All in all, I believe we can look forward to an exciting year in the Corps during 1967. I would request that you continue to put forth your best efforts for the ultimate benefit of yourselves and your country. Again, my very best wishes to you all.

New RCEME Trade Structure

The new trade structure introduced on 1 October 1966 has resulted in the reduction in the number of different trades in RCEME. Some former RCEME trades ceased to exist and others have been amalgamated to form a new trade. The trade changes that have caused the most concern to RCEME personnel is the deletion of the Assistant Instructor (AI) RCEME trade and the amalgamation of the Instrument Technician and Electrical Technician trades to form the new trade of Electro-Mechanical Technician.

The AI RCEME trade ceased to exist on 30 Sep 66 and all personnel qualified AI RCEME, who were not qualified in another RCEME trade, were remustered to the Vehicle Technician trade effective 1 Oct 66. These former AI RCEME will continue to cover present positions and will continue to perform the duties for these positions, and as the unit establishments are reviewed the AI RCEME positions will be changed to technical positions but the duties for these positions will remain the same.

For example the CSM position of a Field Workshop will be changed to a Technical WO 2 position but the incumbent will continue to perform the duties of a CSM. The AI RCEME positions at the RCEME School will be changed to technical positions but the incumbents will continue to perform the duties of a CSM; instructors for Part B Sr NCO Courses, regimental duties, etc. There may be some concern by vehicle technicians that the remustering of AI RCEME to vehicle technician will delay the promotion in this trade but the former AI RCEME position accompanied the incumbent. The former AI RCEME do not cover any technician positions that were in effect on 30 Sep 66 and they will not be posted to any position for which the incumbent requires technical qualification to perform the duties until the AI RCEME is qualified to the appropriate level in his new trade. Some AI RCEME may not be able to qualify to the appropriate level in their new trade to be promoted in rank due to age or lack of technical ability. These personnel who cannot achieve higher qualification will remain in their present rank until normal retirement or be voluntarily remustered to another trade. When the AI RCEME vacates his present position it will be filled by a technically qualified man from any RCEME trade. The technicians posted to these positions must be capable of performing the duties that the previous AI RCEME incumbent performed. Eventually all previous AI RCEME positions, now converted to technician positions, will be filled by technically qualified RCEME personnel; therefore, the technical trades are gaining more positions which in time will increase promotions.

The amalgamation of the Instrument Technician and Electrical Technician to form the new trade of Electro-Mechanical Technician is the same as the Armourer and Gun Mechanic converting to Weapons Technician a few years ago. As in the conversion to Weapons Technician the conversion to Electro-Mechanical Technician requires many changes which take time. New trades training standards and trades tests have to be made up, conversion courses prepared to train Instrument Technicians on electrical equipment and Electrical Technicians on instruments and unit establishments amended to change positions to the new trade. Though all Instrument and Electrical Technicians were remustered to Electro-Mechanical Technicians on 1 Oct 66 personnel will not be qualified in their new trade until they have completed conversion training. During the interim period pending commencement of conversion training it may be necessary to promote personnel to fill existing positions in units. If the existing position requires a technician to maintain electrical equipment then a former Electrical Technician will be promoted or if equipment to be maintained is instruments then a former Instrument Technician will be promoted. When firm policy and dates for conversion training are known personnel who meet the prerequisites for promotion as detailed in CFAO 49-4 will be selected first in order of merit.

The new trade structure has created many changes in technical trades which may cause considerable concern to individuals. In some cases this concern may be the result of insufficient or erroneous information passed on to the individual. It is impossible to provide answers to individual problems through the medium of the RCEME Technical Bulletin but when problems which may cause concern to many individuals are known, interpretation of the current policy with regards to the problem will be published.

THE RCEME TATTOO TEAM

By Lieut RP Britt

In June of this year, the author and Ssgt Peter Funk were told that they would be responsible for training 50 men to participate in the Canadian Armed Forces Tattoo 1967. After several visits to Ottawa, our task became clearer. RCEME along with RC Sigs are to participate in Scene 9 of the Tattoo. This scene is a comedy act, centering on quick-assembly jeeps and motorcycle rides. Director General Centennial (DGCen), CFHQ is providing general guidance on this scene, but details are left to the participating units.

The first problem that presented itself was the selection of the personnel. The School Commandant talked to all the Group 1 and Group 3 Vehicle Courses that would be completed in July. From these groups, 40 Group 1 mechanics and 3 craftsmen Group 3 were selected. CFHQ then provided two additional Group 3 craftsmen and five corporals with varying trades. Of this group of 50, 40 will be participating in the Tattoo while the remaining 10 will stand by as spares.

Sleeping accommodation was obtained in Barrack Block #1, but training accommodation was a more difficult problem. Finally it was decided that the Tattoo Team would become part of Electronic Company for administration purposes and that training would be conducted in their radar shed.

In the meantime 208 Workshop RCEME was preparing four quick-assembly jeeps. The first of these arrived at the School in early August while the remaining three arrived in mid-September. These jeeps were patterned after a former quick-assembly jeep used in 1952.

After completing their trades courses and after annual leave, Tattoo personnel were taken on strength at Electronic Company. They were immediately loaned to various units in the area until training started in October. DGCen estimated that training would require 12 weeks and on this basis, it was decided to start the jeep training on 3 Oct 66. On that day training commenced in earnest.

Four people work on the jeep at a time. Each man must be proficient in all four positions for the sake of versatility. At the end of 12 weeks training it is hoped to have the assembly time down to 2 minutes maximum.

Following completion of this training Tattoo personnel went on Christmas leave. On their return, training will be conducted with RC Sigs and at this stage comedy will be introduced.

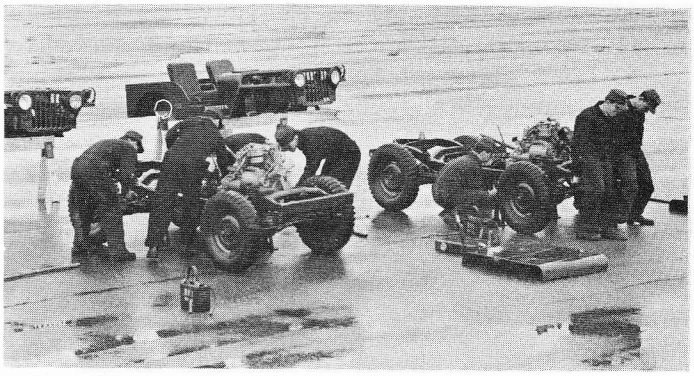
In mid-February all Tattoo participants (approximately 600) will gather in Camp Picton for concentrated rehearsals under the direction of DGCen. At the end of March these personnel will be split into two groups, each group touring Canada on a special train. In mid-May, both groups join forces in Vancouver with nearly 1000 augmentation personnel, and this large cast will perform in Vancouver and Victoria. The original groups will then be flown to Montreal where they will again be augmented by 1000 personnel from the area. This group will perform at Expo 67, the Canadian National Exhibition and Ottawa. Both original groups will then be reconstituted; one to tour Newfoundland and Prince Edward Island; the other to rehearse for a possible tour of the United States.

Disbandment of both groups is expected by the end of September 1967. All Group 1 personnel (RCEME) will then probably attend a special Group 2 course to enable them to keep pace with their classmates who have been gaining experience at their trades while the Tattoo was in existence. On the completion of this course, Tattoo Team members will be posted, resuming their positions in the Corps.

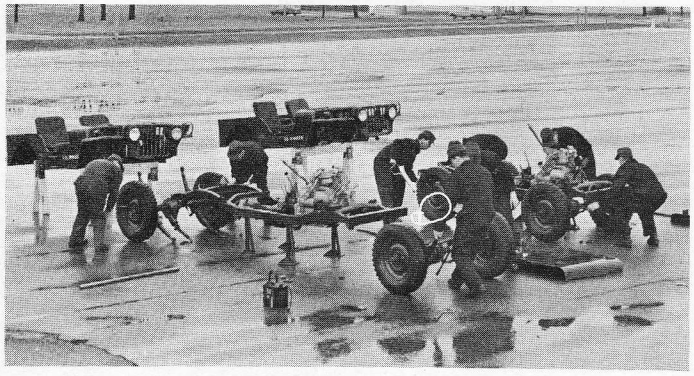
The Canadian Armed Forces Tattoo will involve many hours of hard work, but participants can look forward to seeing Canada and taking part in one of the first and largest shows of its kind to tour Canada.

1. Crews jumping from the two Jeeps after DRIVING them onto the square.

2. Off come the bodies; batteries, radiators and hoods already removed.



3. With the bodies safely on blocks, chasses are raised for the next step.



4. Front and rear ends are stripped.

5. The final step; when engines are on the floor stripping is complete.

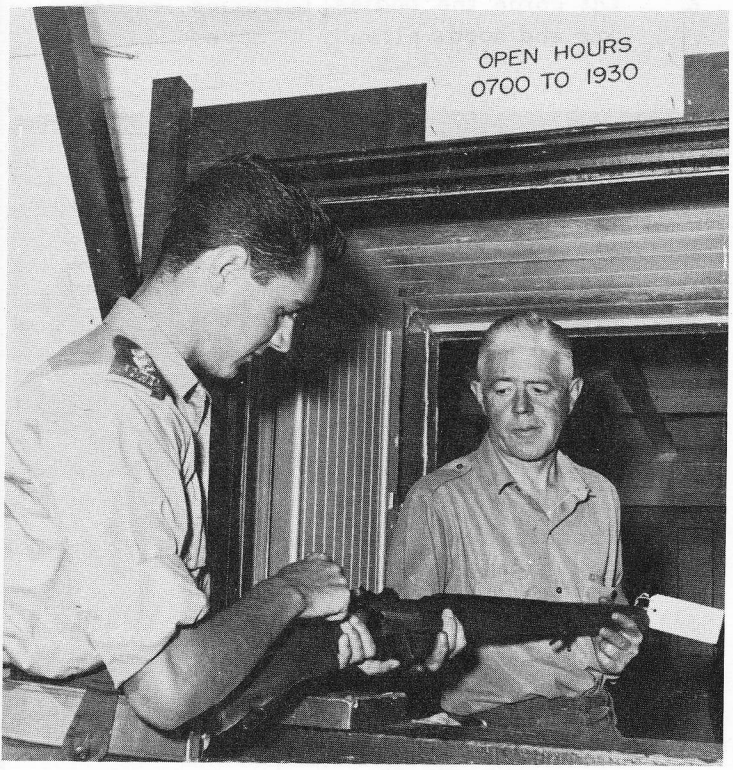
6. Success! Their objective is 2 minutes or less. The crews, all craftsmen, are (l to r) Pelletier, Maidment, Hall, Lecours, Pfeifer, Laverdiere, McSween, Ryan.

RCEME School photos

RCEME ON THE RANGE

BY WO1 HOWARD KEECH

For 49 weeks of the year Building 51 at Connaught Ranges stands lonely and deserted. The remaining three weeks this small shack is the home of the RCEME Weapons Technicians (Armourers) supporting both the DCRA and the Canadian Forces Rifle, Pistol and Sub-machine Gun Competitions. Then it is a beehive of activity, surpassed only by the 'snake pit'.



The author listens while Lieut Andre Tessier, 395 Cadet Corps, explains a fault in one of the cadet's rifles. This is the first step in customer satisfaction.

-American Rifleman Photos

[WO1 KEECH has been the guiding light in the gunsmithing performed at Bisley and Connaught Ranges for many years. During this time he and the technicians associated with him have evolved a reliable, satisfactory method of bedding No 4 Rifles. WO1 Keech has devoted hours and hours of his leisure time to this and to the successful support of the annual shoots. -Editor]

Few people realize the extent of RCEME participation in these competitions and the work involved. To transform an empty building to a fully equipped workshop capable of carrying out all repairs on the weapons involved, stocked with adequate spare parts and materials and staffed with five or six of the most experienced and expert tradesmen in this field of repair, requires a great deal of planning, hard work and the co-operation of all the agencies, workshops and units involved.

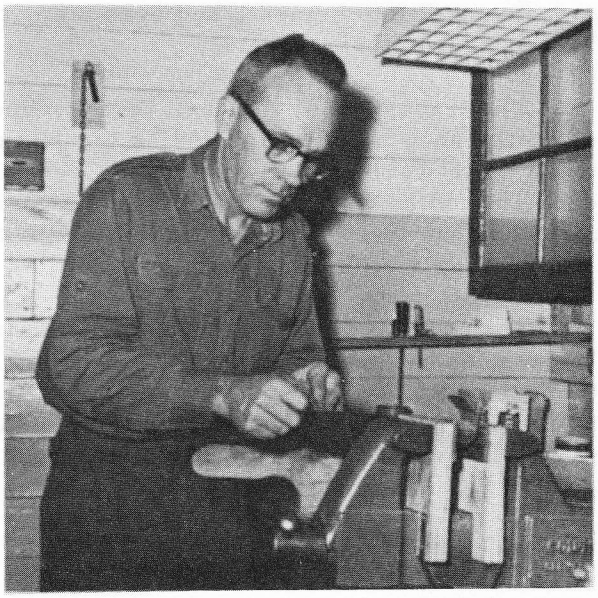
The SO Land Materiel Maintenance is responsible for co-ordinating all aspects of this activity. Early in February as many as 140 separate DIVs are prepared and passed to SO Land Materiel Supply for transmission to the appropriate depot. Component parts are all inspected by RCEME inspection personnel in 25 COD to ensure that they are new and serviceable prior to issue. The Base Maintenance Section CFB Rockcliffe (208 Workshop) receive and hold all stores until they are required.

To speed up 'on the job' repairs, foreends and trigger guards are worked over by 202 Workshop Depot prior to issue and the Maintenance Section at Rockcliffe modify hammers and foresights prior to the competitions.

Many shop expedients - cutters, jigs, floats, etc - have been acquired over the years and these are sharpened and maintained in the weeks preceding the competitions. When 15 July rolls around everything is ready to go.

Parallel with all of this, the preparations for support of the technician accompanying the Bisley Team to England are also proceeding. In this operation the stores are concentrated at 202 in Montreal where they are carefully checked and packed for overseas shipment.

Along comes 1 May and time to cry "Help" to formations, commands and units who 'own' and control the trained tradesmen who are vital to the service to be performed. There are only about a dozen qualified technicians in the service and an attempt is made to train at least one more each season. With summer sickness, overseas postings, summer concentrations and other service commitments it is obvious that difficulty should be expected in acquiring six of



Sgt John Watt polishing a centre bearing. In the background is a leg iron for keeping restless slaves on the job.

these men annually. Because of the excellent co-operation of commanders at all levels, however, it has always been possible to get the desired man for Bisley and the competent workforce who labour from dawn to dusk and often later to keep the shooters on the mound.

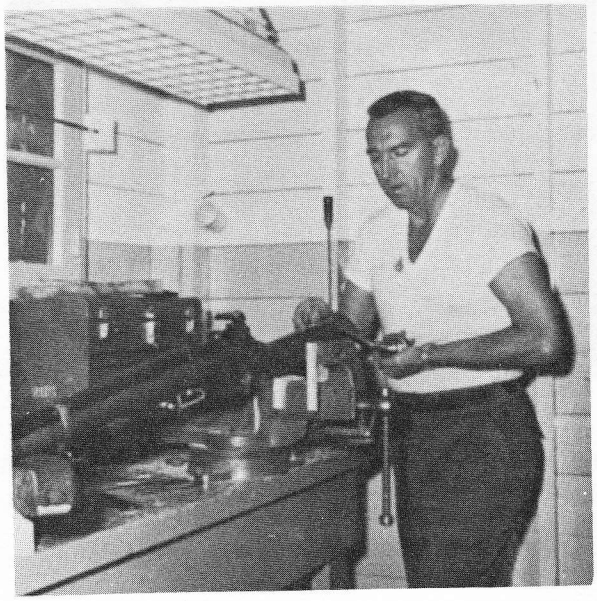
Work on the range can be described in three phases: knowledge of the shooters' problems; knowing what remedial action is necessary; and then doing the work quickly and efficiently. As Bill Ryan has said previously "the realization that having a knowledge of the work and doing it are two different things" is very true. The technician at Connaught must have both these attributes.

Supporting the DCRA at Connaught Ranges is probably the biggest continuing public relations operation performed by RCEME personnel. Competitors come from all parts of Canada, USA, Great Britain, Australia and New Zealand and many of them take advantage of the RCEME services. For many of the competitors, due to their geographical location, Bldg 51 offers the only repair facility available to them from one year to the next, and many others return year after year because they like us.

Competitors are unknowingly selfish. When in trouble, no one else has a problem quite as big as their own. Most competitors use their holidays and go to a great deal of expense to participate at Connaught. For this reason it is important, no matter how busy, to be understanding and to sort out each individual's problems to his or her satisfaction. In many instances the line is very fine as to whether the problem is with the competitor or the weapon.

Many of the competitors speak and understand only French therefore it is always necessary to have one or more of the staff bilingual to properly sort these people out.

The 'slaves' arrive approximately eight days before the competitions commence, set up shop and begin living and thinking rifle and pistol. The first job is to check over 50 No 4 Rifles which are loaned to needy competitors. Eighteen of these rifles are used by the British Cadet Team and these are thoroughly checked and centre-bedded before issue. The fact that these young lads won over $500 during the 1966 competition speaks well for both the rifles and the 'nuts behind the butts'.



Not the least important item is correctly fitted butts. In this picture Sgt Frank Perry works while the camp sleeps.

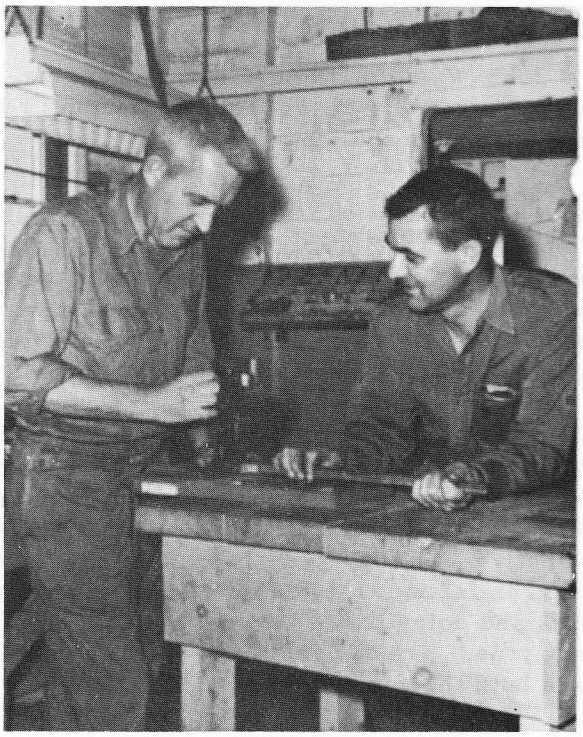
The whole repair program is one of teamwork. Over the years we have developed a technique second to none for bedding and adjusting rifles capable of the greatest accuracy. Moreover it is simple. Every member of the team uses the same technique therefore if it is necessary for a rifle originally set up by John Watt to be further adjusted by Louie Gauthier there is no sweat. He knows exactly what is required.

This is not to imply that unless a rifle is bedded our way it won't shoot. Over the years, however, we have had the opportunity to examine hundreds of rifles bedded in many different ways and by scores of different people - some were good, others so bad they were ridiculous but none have out-performed those adjusted by our methods. Materials used to obtain bearings, in many instances, have ranged from flannelette to cement, and even a smattering of unused train tickets.

The tradesmen live in bell tents grouped behind the shop building and during the competition their world revolves between bed and bench, for although the wicket is only open from 0700 hrs to 1930, work must go on until next morning's rifles are ready.

Then the shoot is over, the competitors disperse, and within a week the stores and tools are returned. Building 51 again stands lonely and forlorn. Nothing remains but to clean up the paperwork and start planning next year's blitz.

Ssgt Ken Shepherd concentrates on the finishing touches to a centre bearing.



Easy does it. Ssgt Ken Shepherd and Sgt Louie Gauthier team up during the final operation of fitting a new barrel.

RCEME School

Subalterns' EME Class

Lt WB MASON was the first recipient of a sword presented on 6 Dec 66 in the Corps of RCEME Officers Mess. He has attended both CMR and RMC. In 1966 he graduated from RMC with a BSc (Electrical Engineering). He spent 1st and 2nd phase O/Cdt training with the RCA before transferring to RCEME in 1965. The presentation was made by Col AL Maclean CD, Commandant RCEME School.

The sword is to be presented annually to the best student officer on the Subalterns' EME Course. Approval of the proposal to present a sword was made by the Executive Committee of the Corps Officers' Fund in 1966. In addition, a plaque was manufactured to record annually the name of the winner.

Selection of the best student officer is based on academic marks, dress and deportment, interest and enthusiasm and a peer rating.

Junior NCO Course

By 2Lt RJM Selman 4 RCHA

During the period 19 Oct 66 - 7 Dec 66 the RCEME School conducted its first Common-to-Corps Junior NCO Course. The candidates represented the following Arms and Services:

a. Royal Canadian Armoured Corps
b. The Royal Canadian Corps of Signals
c. Royal Canadian Infantry Corps
d. The Royal Canadian Army Service Corps
e. The Royal Canadian Army Medical Corps
f. The Corps of Royal Canadian Electrical and Mechanical Engineers
g. The Canadian Postal Corps

The course was conducted by Regimental Company of the School in accordance with the relatively new "Common-to-Corps Junior NCO Course Package" The regimental NCO Platoon was staffed by the following members of the 4th Regiment Royal Canadian Horse Artillery from Canadian Forces Base, Petawawa: 2Lt RJM Selman, Sgt Hayes GW, Bdr Ring FH, Bdr Jervah RE, Bdr Coutu RA, Bdr Foote AJ.

The aim of the course was to train the candidate to a level where he could effectively be employed as a Junior NCO in a unit of his Corps. The candidates were selected from personnel who had completed the Common-to-All-Corps Recruit Training Standard, displayed leadership qualities and met the course prerequisites.

The training was conducted with a view

(continued on the following page)

Junior NCO candidates manning a road block. L to r: Sgmn WB Malone; Sgt GW Hayes (platoon sergeant for the course) being checked; Cfn GR Farnsworth and Pte HA Norman RCASC.

2Lt John Selman briefing three section commanders during Exercise Lost Patrol: (l to r) Rfn RE Myers, QOR; Sig WB Malone; 2Lt Selman and Tpr JR Bennett.

(JUNIOR NCO COURSE continued)

to:

a. developing and assessing the candidates leadership ability,
b. developing and assessing the ability to instruct in the basic skills,
c. teaching and practicing the candidate in military subjects which are required by a Junior NCO.

The duration of the course was 35 training days. The initial five days of the course were devoted to setting a high level of military bearing and proficiency. During this time, tests were conducted to determine the level of knowledge of the candidates. Selected subjects, ie, Methods of Instruction, were given to improve the candidate's personal deportment and prepare them for future drill mutuals. Commencing on training day six and progressing to training day 26, the stress of training was directed to the candidates learning, practicing and gaining experience in practical instruction.

The candidates were required to present a minimum of 13 mutuals covering the following subjects: drill, rifle FN C1, automatic rifle FN C2, SMG C1, pistol 9mm, grenades, first aid and nuclear biological and chemical warfare.

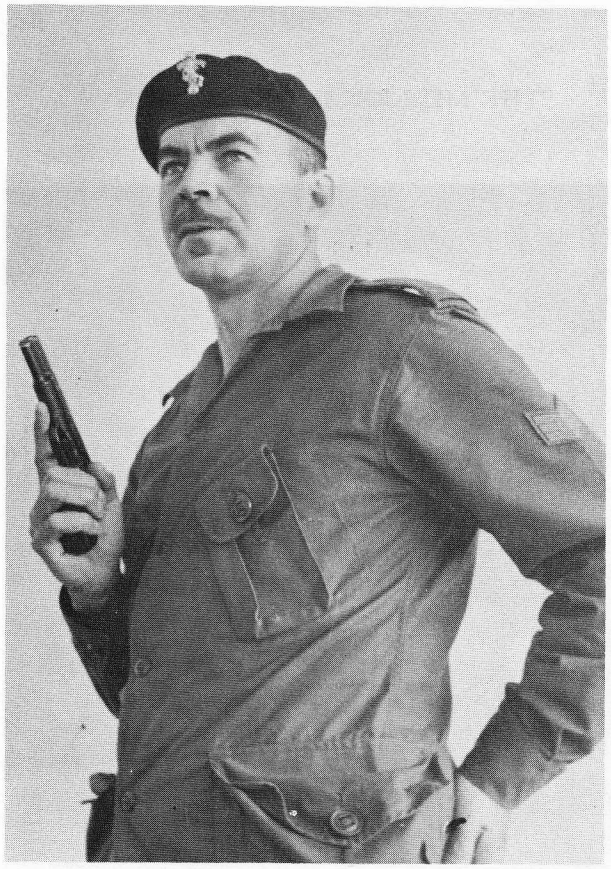
Also during this period the candidates were introduced to initiative tests and small group field exercises. These tests and exercises were designed to assess and develop the candidate's natural leadership abilities. During this entire period the role of the instructor was to guide and assist the candidate.

Training days 26-35 were the culmination of the course. It was throughout this period that the candidates demonstrated if they had achieved the specified course standard. The highlight of this last training period was a three-day field exercise during which the candidates were assessed on the practical application of their course training.

The course graduation parade was held on 7 Dec 66. Lt Col EG Jones, CD, inspected the 23 candidates who successfully completed the course. The RCEME School band provided the music, conducted by WO 2 Monkman. Tpr Bennett JR, a member of the Fort Garry Horse, was presented with a ceramic RCEME crested mug, as the outstanding candidate on the course. After the march past, the candidates were awarded the qualification of Junior NCO by Col AL Maclean,

A Top Pistol Shot

By Capt RE Betzner



Before discussing the main subject "A top pistol shot", I would like to introduce to those of you who have not met him, Sgt PJ (Jim) Dewitte. Sgt Dewitte, now a small arms technician with the Maintenance Troop of the Fort Garry Horse, began his army career in 1943 when he joined the REME Corps as an armourer in England. His time until 1947 was served with the AA Command and the Paratroop Regiment. Sgt Dewitte left the regular army at this time only to return as a full time armourer with the Territorial Army in 1950. (The Territional Army (British Milita) employs certain regular army personnel on a full-time basis).

An application for transfer to the Canadian Army found Sgt Dewitte assigned in 1954 to Air Supply with the RCASC because of his previous jump training. Sgt Dewitte returned to his armourer's trade in 1958 when his request for transfer to RCEME was approved. He is still serving in this capacity.

Until recently Sgt Dewitte had not taken an active interest in competitive shooting. However last summer (1966) he entered the Western Command Pistol Shoot-off after taking up recreational shooting with a local Calgary pistol club. In this competition he placed top in all five categories on the pistol to make a clean sweep. The categories are the 50 yard slow, 25 yard timed (20 seconds for 5 shots), 25 yard rapid (10 seconds for 5 shots), the 15 yard snap (2 seconds per shot), and the aggregate.

Later on in the summer, he competed in the Dominion of Canada Rifle Association (DCRA) pistol shoot in Ottawa as a member of his pistol club. The competitors are handicapped according to their degree of proficiency in pistol shooting and are entered in one of four categories. These are in order of skill required: Master, Expert, Sharpshooter and Marksman. Sgt Dewitte competed in the Expert category against 60 other pistol shots from all over North America including some of the top pistol shots from the Detroit and Chicago Police Forces, the RCMP and many provincial and municipal police forces. He placed 6th out of 60 in the .22 calibre class and 11th out of 60 in the large bore class.

Immediately following the DCRA he entered the Canadian Armed Forces Pistol Shoot in Ottawa. At the end of the competition, Sgt Dewitte was presented with the award of Top

Pistol Shot in the Canadian Armed Forces. Surprisingly enough he didn't win any event in the shoot but gained top aggregate with consistant seconds in all practice.

Presently Sgt Dewitte has qualified as a member of a five-man pistol team from Alberta which plans to compete in the Winter Games to be held in Quebec City in February 1967. In the future he has his eyes on a spot on the team representing Canada in the Pan - American Games in Winnipeg this summer.

[We join with RCEME technicians and the Fort Garry Horse in wishing Sgt Dewitte 'good shooting' in the future and hope he makes it to Winnipeg for the Pan - Am Games.

- Ed]

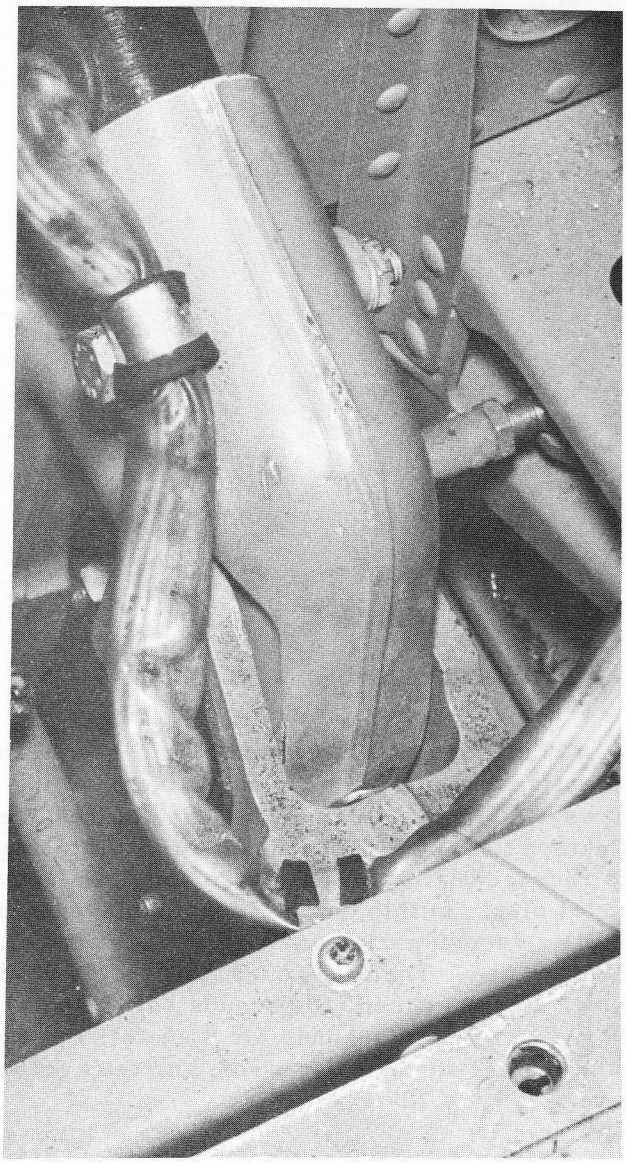
Good Show !

Cfn Wayne Brydges, an aircraft technician with just over one year experience since completing his basic course at Camp Borden, was assigned the task of cleaning the cockpit underfloor area of a CH 113A helicopter on periodic inspection.

While cleaning around the base of the cyclic control stick he found a penny lodged between the base of the stick and the stick yoke. Only the edge of the coin was visible. It is quite possible if the coin had been left in this position it could have caused the controls to become jammed.

Cfn Brydges is to be commended for his alertness in finding a foreign object that because of its position could easily have been missed and possibly have caused a serious accident costing the lives of the crew and a million dollar aircraft.

"THE MILLION DOLLAR PENNY"



Cfn Brydges is at present serving with 1 Tpt Hel Pl at CFB St Hubert.

Corps Plaque

In the past few months many changes and additions have occurred in the Officers' Mess at the RCEME School. The building itself has been painted, exterior and interior; the bar-room has been renovated and a new carpet is now located in the anteroom.

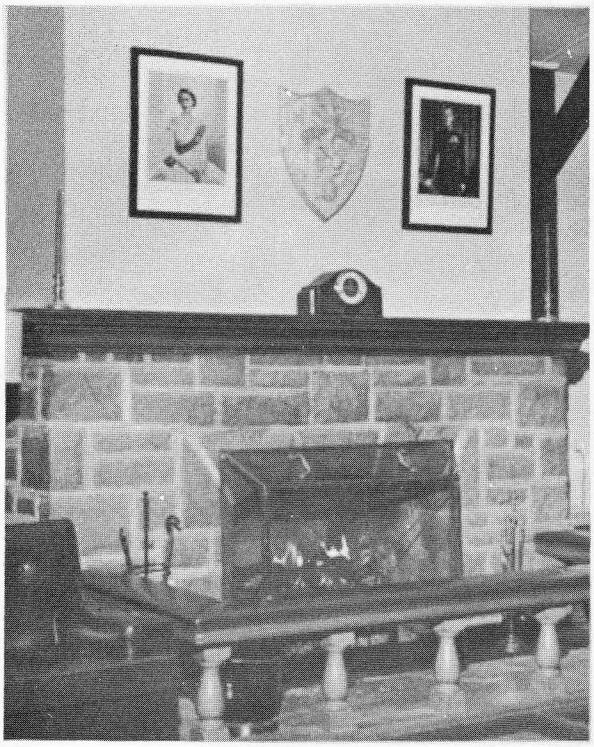
In keeping with these changes it was felt that a new plaque of the Corps Badge should be obtained for above the fireplace in the anteroom.

As the mechanics of obtaining a new plaque were set in motion, it was remembered that in 1965 the Corps of RCEME presented a plaque of the Corps Badge to Le Collège Militaire Royal de Saint-Jean. This plaque, an outstanding work of art, was hand carved from a solid block of maple by Monsieur Lauréat Vallière of St Romuald d'Etchemin, Quebec.

Realizing that a similar plaque of such fine quality would be well suited for the mess, M Vallière was commissioned to carve another plaque.

On 13 Dec 66 the plaque was placed in its new home.

It is with a great deal of pride and pleasure that the RCEME Officers' Mess now displays its new plaque.



All RCEME Units ...

...Please Note

HER LINE IS ALWAYS BUSY, SO .....
MAY WE HAVE YOUR NUMBER, please.

We propose publishing a complete list of RCEME unit telephone numbers as a handy reference in case of emergency.

This, of course, means YOU. Jot your telephone number(s) down right now on a piece of paper. Send it to the EDITOR,
RCEME TECHNICAL BULLETIN,
LMM MATCOM
CFB Rockcliffe, Ont.

New Aircraft Hangar in 4 CIBG

by Capt CA Penny

With the recent opening of the new airfield in 4 CIBG the aircraft repair and maintenance organization has undergone some long-needed improvements. No longer do pilots and ground-crews have to vie with ground vehicles for a spot in a crowded compound or garage but can come and go with relative ease at their new airfield.

The Helicopter Troop, 'C' Squadron, 8 Canadian Hussars, owners and operators of six of the brigades eight helicopters, operate the new airfield. The aircraft platoon of 4 Field Workshop is a lodger sub-unit at the airfield and occupy approximately one-half of the total accommodation.

To fully understand the significance and impact the new aircraft facility has had on the operators and maintenance personnel, it is necessary to describe and compare the previous and present accommodation. For the operators and their unit maintenance personnel it has been a change from crowded quarters with ground vehicles and minimum office space to rather spacious quarters with office, pilots' ready room, flight-planning room, maintenance office, lecture room, and ample aircraft hangaring facilities.

For the aircraft platoon of the workshop the changes have been even more substantial. Old accommodation totaled 3600 square feet of working area in a poorly lighted vehicle garage, plus one small office. Tarmac for running aircraft and for landing and taking off was very small, necessitating a confined-area technique on every landing and take-off. Parking space

for shop vans and trailers was limited. Field repair on Cessna L19 aircraft had to be done at the unit as there was no landing strip at the workshop.

The aircraft platoon working area in the new hangar is 4300 square feet, plus 2000 square feet of office and shop space. Office and shop space includes platoon commander's office, log control office, stores office, telecom shop, instrument and electrical shop, sheet metal shop, coffee room, and paint booth/blade balancing room.

The hangar was designed to accommodate both the helicopter troop and the aircraft platoon. The design incorporated many maintenance features, some of which are rather unique. The most striking feature is the arrangement whereby the shop vans can be used from inside the building. This was accomplished by having a special window designed, opening inward and of a size to accept the door of the shop van. Stairs down from the window and a canvas buffer for protection against the weather complete the arrangement. The advantages of this arrangement are self-evident. Mobility is maintained at a high level as very little equipment has to be unloaded from the vans even in long-term static operations. The problem of heating shop vans during the winter to a reasonable working temperature is alleviated as building heat is used. Less floor space is required in the hangar during static operation. Each van is supplied with electrical power from an outside outlet and the vans sit on a special concrete pad below each prepared window.

Each shop is supplied with outlets for compressed air and the proper electrical power for the equipment involved. The main working area has conveniently-located electrical and air outlets as well as grounding plugs. The lighting is far superior to that in the old accommodation. The building incorporates an electrically-operated overhead crane which runs on an 'I' beam. It is capable of lifting engines, transmissions and rotor heads, and takes the place of a HIAB crane or M62 during static operation.

A combination blade balancing room/paint booth is also included in the hangar. It is large enough to accommodate a CH112 or an L19 (less wings) for painting. The properly ventilated and lighted (explosion proof lights) room has an automatic door-closing apparatus in case of fire. It is also used as a blade balancing room because it is draught-free when closed.

With the addition of the new airfield to the brigade facilities the aircraft operators and maintenance personnel finally have accommodation suitable for proper aircraft maintenance. Better working conditions with its accompanying rise in morale can only have one result: Better Service and Higher Serviceability.

A Light Recovery Vehicle

By WO1 Baynes 23 Base Wksp REME

The RCEME Technical Bulletin dated July 1966 shows a 3/4 ton equipped for recovery which is quite similar to the one 'made up' in Halifax a few years ago.

The M 62 never was noted for its ability on icy streets, especially if a steep gradient was involved.

Our problem there was recovering vehicles from the narrow streets and alleys which army drivers somehow managed to find, particularly C Pro Con a cold, snowy, winter night. I think they must have waited for the recovery vehicle in the local bootleggers.

After considerable experimentation, the finished product was also mounted on a steel plate and as far forward as possible. Overload springs were salvaged from a condemned three tonner and installed. Two large blocks of lead, (recovered from the local RCEME Militia unit who were scrapping their battery room) were installed in front of the front bumper for ballast.

This resulted in an excellent 'town' recovery vehicle for small equipments, especially as personnel did not have to be familiar with the operation of the M 62.

Although two NCOs did recover a SC 3-ton truck from Sidney, about 300 miles away, it proved that it was not satisfactory for larger vehicles on long trips as the front end was too light.

SOLTAU '66

By Lt RN Fischer, 4 Fd Wksp

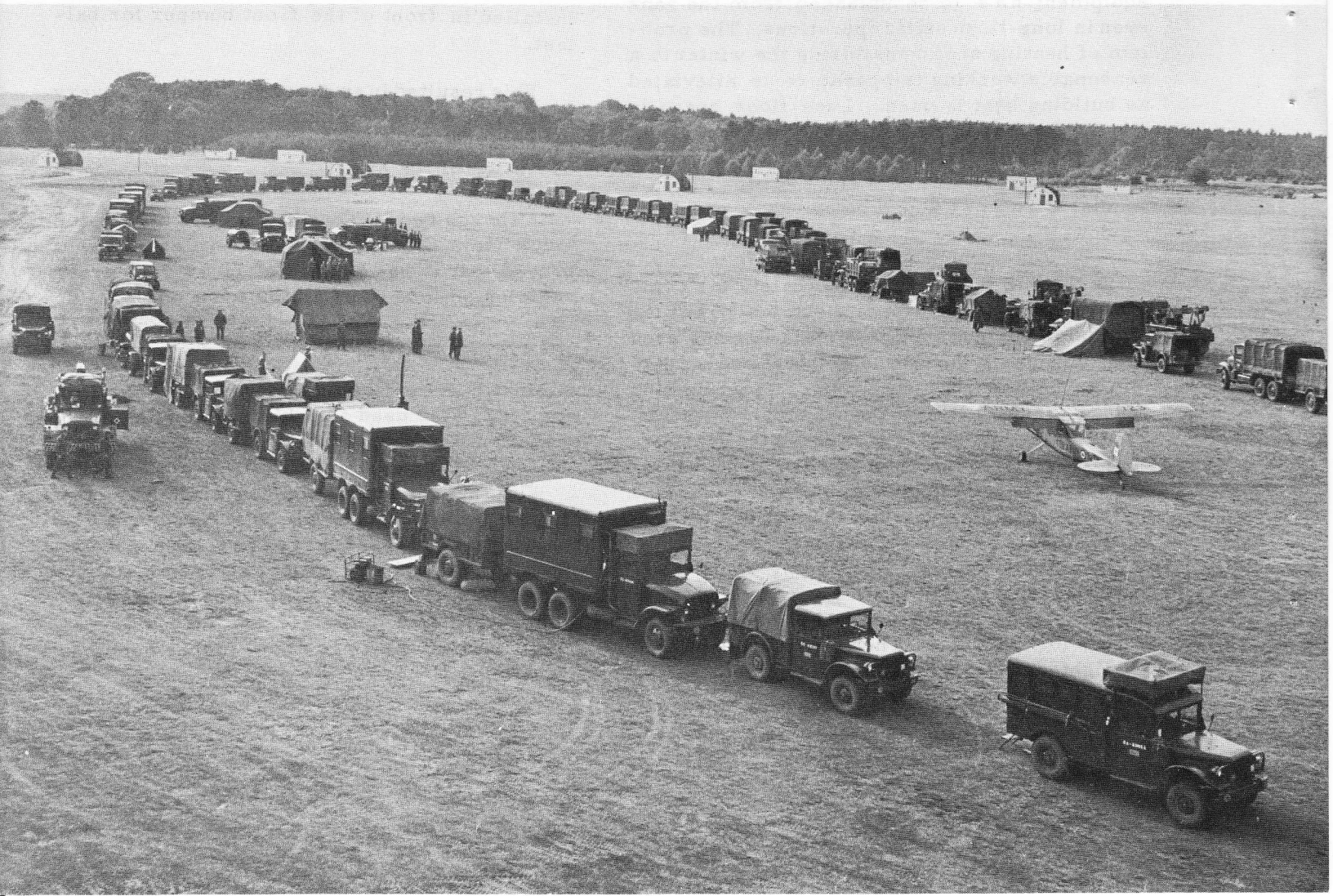
Last September, 4 Field Workshop paid its annual visit to the Soltau Training Area. We set out on this 'pilgrimage' in hopes of finding both good weather and a good time; surprisingly, we were fortunate enough to experience that rare combination. For those who had just 'rotated' this was our first chance to see this workshop in the field.

Although the exercise was rather light from the production point of view, it did give everyone ample opportunity to assess the operational efficiency of their individual sections. As a result of our first move it was generally agreed that some of our drills and SOPs required revision. These points having been remedied the remainder of the exercise saw the workshop operate remarkably well, both during night and day operations.

Of course we cannot overlook the dauntless courage of our enemy (portrayed by the FRP) who never let a day (or night) go by without launching an attack of some description.

I wonder how many remember the night of Sept 12th when, following an alert at 2230 hrs we stood in our cold trenches for something like 3 hours ... I also wonder how many knew that the so-called 'enemy' whom everyone thought was within our perimeter, was in fact the AO and the Training Officer trying to find their way back to their quarters ... C'est la guerre!

Certainly all the officers will remember (those that can) the delicious and well-prepared



steak dinner they enjoyed that first Saturday night.

It was decided that everyone was to get a good night's sleep prior to the long journey back to Fort Chambly. Our staging area was to be Rheinsalen Camp, an old wartime Luftwaffe base. Our arrival and subsequent deployment caused a great deal of interest, especially since the workshop was deployed in much the same fashion as covered wagons in the old West. From an AOP aircraft we appeared even more intriguing, as the photograph clearly shows. Many of us had not realized until then the large number of vehicles and equipments which made up the workshop. (It should be noted that the FRP's 22 vehicles are not shown here).

A few words of appreciation are directed to our Training Officer Capt BH Simms who put a lot of personal work in this exercise and certainly had a big hand in making it the success that it was.

As everyone anxiously returned home, armed with green jellybeans in one hand and a fertility basket in the other, it occurred to me that the high degree of morale displayed during this exercise certainly reflects a unanimous feeling that 4 Field Workshop certainly is the most operational RCEME workshop in our Corps.

Writing Manuals may be your next job !

By Murdoch Adamson LMM/Mat Comd HQ

[As promised in the Oct 66 Technical Bulletin, here is the second half of Murdoch Adamson's article on the writing of technical manuals. -Editor]

Writing and Illustrating the Manual

The actual writing is not simple. Good technical writing is more than skimming through the subject matter and setting down points that occur to the writer. Good writing comes only from much study and careful consideration of the needs of the eventual user and from thorough organization of your material.

You Must Use an Outline

The need to understand the eventual user is fundamental. You must present the information at his level. The reading level for most instruction manuals should be that of a second year high school student. A typical user can be expected to have a minimum of technical background and no previous experience with the equipment. Base Repair instruction manual readers can be assumed to have considerable technical background with other equipment, but none with the equipment covered by the manual.

Here are nine hints you can use in writing an instruction manual. Try to use as many of these guide lines as possible whenever you write any kind of manual.

1. Use short sentences.

2. Use short paragraphs and a separate paragraph for each thought.

3. Give specific instructions. Statements such as "Test in accordance with authorized shop procedure", are worthless unless the source of such procedures is given.

4. Avoid uncommon words, unnecessary technical phraseology, and words peculiar to a single trade.

5. Avoid complicated phrasing. Delete superfluous words.

6. Use exact nomenclature. Name each part, component, or subassembly. Do not use such references as 'the unit".

7. Divide the text by appropriate headings and sub-headings.

8. Tie in discussion and illustrations so that one follows closely on the other.

9. Edit the manual. Instruction books are teaching devices and as such deserve proper presentation.

Good illustrations are just as important as good text. So never skimp on illustrations. The better your photos and drawings, the greater the chance of quick acceptance by the user; he'll make more use of the manual too. Keep the following hints in mind when you prepare illustrations.

Photographs

Photographs may be used for equipment views, operational views and parts identification.

Photographs usually require retouching to obtain detail sharpness and contrast.

Eliminate superfluous or unattractive background by trimming and retouching or opaquing.

Use exploded views to identify parts in mechanical assemblies, and assembled chassis views for electronic equipment.

Identify parts by number, reference symbol, or name on the picture.

For identification nomenclature use copy prepared with mechanical lettering guides.

Plan each picture, and supply the photographer with a rough layout so that each view covers the required subject matter.

Drawings

For wiring diagrams and electrical schematics, use approved practices on symbols, line weights, conventions and layout as recommended by the military or as dictated by the application.

Use mechanical schematic drawings to illustrate operating features and maintenance practices. Present hydraulic, pneumatic and

mechanical drive systems in schematic form.

Specify plan views to show installation and dimensions and panel markings.

Simplify the job of explaining operating and maintenance detail by liberal use of pictorial drawings. Isometric projection is common, but dimetric and trimetric projection are more natural in appearance. Shade them when it will add realism.

Use exploded views to show assembly and disassembly procedures.

Use pictorial drawing technique.

Check List

Instruction manuals vary so much that it is impossible to set up a typical outline. However, you'll find the following check list helpful. Essentially, it is a listing of almost every subject item you'll meet in writing a manual.

To use this list, just check the topics you'd like to include. Add any others that are peculiar to the subject. Then you'll have a good outline to guide your writing. And remember when you write, be clear and direct. Use the active voice wherever possible.

Description

What is this information
Purpose of information
How to use this information
Other publications required
Illustration of equipment
Identify manufacturer
Equipment name and number
Relate to other models
Relate to associated equipment
Modifications available
If system, what are units
If in larger system, explain
What does equipment do
What goes in
What happens to it
What comes out
Why do it this way
What is equipment used with
Warnings and precautions
Where, when, why is it used
Who uses it
Advantages of equipment
Limitations of equipment
Accessories supplied
Accessories not supplied
Basic principle of operation
List characteristics
List controls
List connectors
List cables
Power requirements
Weights and dimensions
Operating supplies required
Installation requirements
Operator requirements
Weather proofing
Tropicalization or winterization
Note patent numbers
Give copyright date
Note on government licensing

Operation

Repeat from preceding as necessary
Write to operator's level
Operator requirements
Illustrations of what operator sees
Identify panel controls
Unpacking
Installation requirements
Installation procedures
Intercabling drawings, etc.
Tabulate modes of operation
When are different modes used
Operational block diagrams
Enough theory for operator
Pre-operational adjustments
Connecting: inputs, outputs
Accessory equipment
Standby operation
Operation of the equipment
Emergency operation
Turning off the equipment
Post-operational adjustments
Keeping a log of operation
Local and remote operation
Warnings, precautions
Supplies needed
Replacing supplies
Define unusual expressions
Explain unusual procedures
Operator's tests for operation
Operators maintenance check chart
Fuse, tube, vibrator, etc, replacement table

Preventive Maintenance

Repeat from preceding as necessary
Write to technician's level
Technician requirements
Check-chart for proper operation
Maintenance check-chart
Lubrication chart
Periodical checks (hourly, daily, etc)
How to gain access for maintenance
Periodic overhaul procedures
Precautions, warnings
Special test circuits
Special test setups
Safety precautions
Tube, fuse, vibrator, etc, location
Pre-maintenance procedures
Post-maintenance procedures
Cleaning, painting, polishing
Corrosion: rust, water, salt-spray, etc
Mechanical checks
Parts replacement schedule

Corrective Maintenance

Repeat from preceding as needed
Write to technician's level
Technician's requirements
Recommended maintenance approach
Illustrations of equipment
Overhaul procedures
Mechanical disassembly drawings
Mechanical assembly drawings
Accessory equipment required
Special tools required
List faults and probable causes
Component identification charts
Trouble-shooting output to input
Trouble-shooting for system by unit, at controls, by symptoms, by test points, and by test signal
Mechanical exploded views
Special test circuits
Illustrations showing adjustments
Mechanical, hydraulic pneumatic, electrical servicing
Disassembly, reassembly
Emergency repair
Voltages on schematic drawings
Wave shapes on schematic drawings
List of component parts
Repair: cabinet, corrosion, rust, water damage, etc
Signal tracing chart
Charts: oscilliscope wave forms, voltage, resistance

Points to Remember

Drawings are better than words
Hold consistant nomenclature
Hold consistant technical level
Write to readers' level
Will it be understood
Write for readers' interest
Use short words
Use simple sentences
Keep paragraphs brief
Table of contents
List of illustrations
List of tables

Summary

Remember, a good instruction manual tells the reader what to do, how to do it, when to do it, why to do it. And, if possible, the manual should show the reader how to do his job. Good illustrations are important in every instruction manual. Clear organization of the writing job is important. A good instruction manual cannot be written without an outline.

GUIDES TO USE IN MAKING A DECISION

1 Know the objective.

2 Collect the facts. Get all available data and arrange in order. Make an appreciation (estimate) of the situation.

3 Consider alternative means of obtaining the objective.

4 Line up the pros and cons of each alternative, then choose between them.

5 Choose the right time to make a decision. Use time to consider problems and let situation ripen when time permits.

6 Make a flexible decision and change it if the need arises.

7 Be prepared to stand some loss as well as gain.

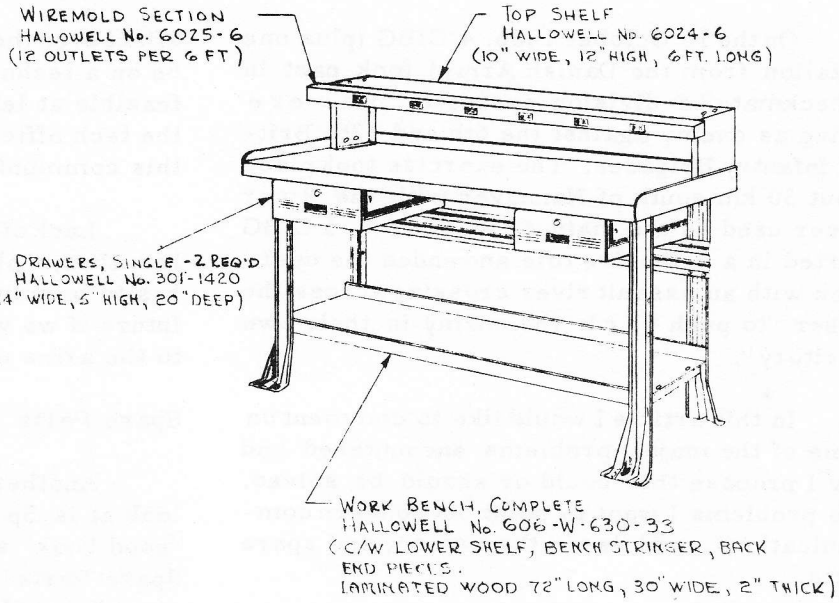
What's New

New Electrical Test Bench

After many years of service, the old familiar electrical test bench (Table, Electrical, Test and Maintenance) is to be retired. (Perhaps to the Corps Museum at the school.)

The Hallowell bench, with a top shelf, drawers and wiremold as accessories, after months of user trials has been recommended to replace it.

The new benches will be received as a do-it-yourself kit and the accompanying illustration may help in its assembling. At least you will know what one looks like.


WIREMOLD SECTION
HALLOWELL No. 6025-6
(12 OUTLETS PER 6 FT)
TOP SHELF
HALLOWELL No. 6024-6
(10" WIDE, 12" HIGH, 6 FT. LONG)
DRAWERS, SINGLE - 2 REQ'D
HALLOWELL No. 301-1420
(14" WIDE, 5" HIGH, 20" DEEP)
WORK BENCH, COMPLETE
HALLOWELL No. 606-W-630-33
(C/W LOWER SHELF, BENCH STRINGER, BACK
END PIECES.
LAMINATED WOOD 72" LONG, 30" WIDE, 2" THICK)

Chlorinated Tapping Fluids

Two new metal-cutting fluids, containing chlorinated hydrocarbons and corrosion inhibitors, reduce friction and produce a smooth surface when threads are cut in metal. They evaporate quickly leaving no residue.

Two suppliers of products in this category were found in the Toronto area.

- Rapid Tap made in the USA and distributed in Canada by James Morton Ltd, 126 Main Street, Galt. Cost $3.50 for a 16 oz can.

- Croma Tap made by Cromac Chemical Co Ltd, 203 Bentworth Avenue, Toronto 19. Cost $3.00 for a 16 oz can.

Tests show these two materials to be very similar in all ways and the following paragraphs apply to both.

Their main use is in the production of threads by hand use of dies and taps where it gives outstanding results. It can also be used for hand drilling and reaming. Use of the fluid in machine operations of this kind is limited to those which do not produce excessive heat. It is applied sparingly to the cutting edges in all cases. It is effective on steel, stainless steel, copper, bronze, brass, aluminum and magnesium. It is used in hand tapping operations on aluminum only.

The torque required to tap a 3/8 inch NF thread in a hole drilled in steel and copper with a letter Q drill was measured in multiple tests using lubricating oil, sulphur compounds and these chlorinated fluids as tapping compounds. The results were as follows:-

a. The chlorinated fluids reduced the torque required by an average of 50 percent in steel. The other materials reduced torque by 20 percent or less.

b. The threads produced using the chlorinated fluids are much smoother. There are no torn or rough sections.

c. Taps and dies which are dull and worn beyond use with conventional compounds can still be used, with good results, when the chlorinated fluid is applied.

d. A 1-inch thick piece of copper was drilled and threaded easily with a worn

(continued on page 23)

Exercise 'Checkmate'

The 2 R 22eR Maintenance Platoon

By Lieut HP Martel, OC Maint Pl, 2 R22eR

On the 10 October 1966, 4 CIBG (plus one battalion from the Danish Army) took part in "Checkmate" a division exercise. We were acting as enemy against the 6th and 12th British Infantry Brigades. The exercise took place about 30 km south of Hannover with the River Weser used as the main obstacle. 4 CIBG started in a defensive role and ended the operation with an assault river crossing across the Weser "to push back the enemy in their own territory".

In this article I would like to comment on some of the major problems encountered and how I propose they could or should be solved. The problems I want to point out concern communications, vehicles in the platoon, and spare parts.

Communications

With the introduction of the APCs in the Army, movement on the battlefield is considerably faster and communications have become still more vital than they were previously. At present, the OC of the Maintenance Platoon is equipped with '510' sets to communicate with his APCs and to tune in on the battalion administrative net. The 'B' set is good for 5 miles only which is most unsatisfactory. The battalion operates on such a wide front and so deep that the rifle companies are out of range. All calls for assistance have to go on the battalion command net. In operations you cannot clutter up the command net with administrative problens!

Looking at it another way, one objection might be that an APC down as a casualty is an operational problem and must go on the command net. In that case, two things usually happen; either the information is distorted by the time it reaches the technical officer or else it is so delayed as to be too late to do anything to improve the situation.

How could the problem be solved? The ideal solution would be for the technical officer to be with battalion HQ and be equipped with an 'A' set. With a 'B' set at maintenance platoon in A Echelon, communications would be kept at a technical level from front to rear. To that effect even the maintenance platoon APCs could be on a technical net. If this solution is not feasible at least one 'A' set should be given to the tech officer in 'A' echelon to help improve this communication problem.

Lack of communications is a problem that has always plagued RCEME field units and it has to be solved one way or another in the near future if we want to improve our technical help to the arms units.

Spare Parts

Another problem I would like to take a look at is Spare Parts Section location. The 'good book' says that the normal location for Spare Parts is B Echelon. So I started out this way. I quickly found out that this situation was not very practical. When parts are needed for the forward sub-units, they have to be available quickly. Any delay such as going back to B Echelon to get the spares might compromise the success of an operation.

But what if the vehicle has to go to B Echelon for repairs? In that case, the equipment can stop at A Echelon for preliminary diagnosis; the parts can be given to the driver; and then the casualty is taken back to B Echelon for the repairs. In any event B Echelon is usually located in the BAA along with the OFP.

Another problem connected with spare parts when on manoeuvres is accounting. On fast-moving exercises like Checkmate, it was physically impossible to carry a job card or a 2149 around. In the middle of the night when it is pitch-black, raining cats and dogs, it is no time to carry pieces of paper around and fill them out. This is the old conflict of trying to operate under wartime conditions but using peacetime accounting.

To be practical and to avoid having the operation slowing down because of administration we operated, up to a point, using wartime accounting. Things went well on the exercise but we had a hard time trying to straighten out the mess when we were back in garrison. This might not be the most orthodox way to operate but it sure helps to give the arms units

the service we are supposed to provide and which is or should be the aim of the RCEME Corps.

With all the specialists there are in the Forces to-day, I am sure a better system could be devised. Accounting should either be simplified for large scale manoeuvres, or wartime accounting should be used for the duration of the exercise.

Vehicles in the Platoon

The last problem is that of the APCs allotted to the maintenance platoon under the Infantry Battalion W/E 5-2. Under the present scale three APEs are allotted to us. (I have stopped trying to figure out the logic behind this magic figure "3".) The future establishment calls for four ARVLs to the maintenance platoon - one for each rifle company. Even that number will be unsatisfactory. As everybody knows, these are for maintenance and repair purposes, but there are five - not four - main groups in a Battalion: the four rifle companies and the HQ and support companies. There are enough APCs and CPs operating as a group in HQ and support companies to warrant the allocation of at least one more ARVL per battalion.

Coming back to Checkmate we almost had to operate with three APCs only. I say almost because just before we left, I succeeded in getting one more APC for the fourth rifle company. But to that time, we operated with three APCs and it caused a few problems. For example it meant that one rifle company and HQ and support companies always operated without the close support repair facilities provided by an APC-mounted repair team. And it happened many times that the repair teams were delayed in answering to a repair request because they had to move by wheeled vehicles. I suggest that some considerations be given to allotting five ARVLs to the maintenance platoon. If the land forces are to go to track vehicles, we might as well do the conversion right and not half way.

These are a few of the problems encountered during Checkmate and during any other manoeuvres. I have tried to suggest a few logical and practical solutions to the problems. These may not be ideal but we have to start somewhere.

The RCEME Corps was formed to provide a service. To give good support you have to be equipped adequately. In the meantime, we will keep on maintaining and repairing the combat units' equipment to the best of our capabilities and hope that the future will show an improvement in the facilities given to us to achieve our aim. As long as the RCEME Corps will accept, train and provide the units with as good a brand of technicians as we have now, no obstacles will ever stop the RCEME Corps from keeping the Canadian Armed Forces (Land) mobile.

(Chlorinated Tapping Fluids continued)

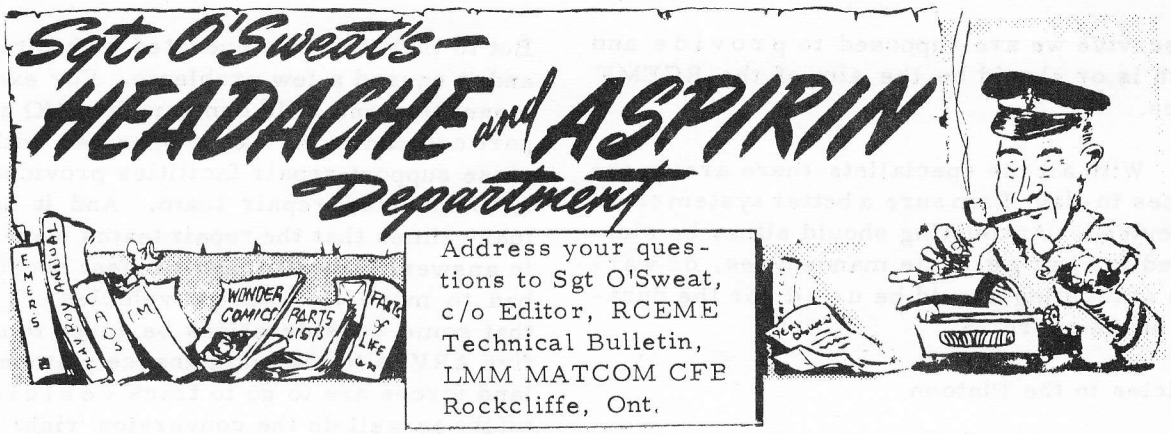
tap using the chlorinated fluid. This operation was impossible using other tapping compounds.

The manufacturers of these chlorinated tapping fluids have given them a toxicity rating of MAC-500 PPM. The cans are labelled "low toxicity". However, this is a volatile liquid and when the ambient temperature or the work becomes warmer than normal, fumes are produced rapidly. The MAC can easily and quickly be exceeded. Excessive inhalation of the fumes, and skin or eye contact with the liquid must be avoided. The fumes have a narcotic effect. Skin or eye contact causes irritation. The fluid must not be allowed to contact very hot surfaces or a direct flame causing a poisonous gas can be created.

DID YOU KNOW?

Here are the highest average incomes in Canadian cities as revealed by 1964 income tax returns. Sault Ste Marie and Sarnia were respectively first and second in 1963 as well.

1	Sault Ste Marie	$5,417
2	Sarnia	$5,340
3	Windsor	$5,278
4	Oshawa	$5,242
5	St Catherines	$5,184
6	Vancouver	$5,162
7	Ottawa	$5,144


Sgt. O'Sweat's—
HEADACHE and ASPIRIN
Department
WONDER COMICS
PARTS LISTS
Address your questions to Sgt O'Sweat, c/o Editor, RCEME Technical Bulletin, LMM MATCOM CFB Rockcliffe, Ont.

Dear Sgt O'Sweat;

My unit has lost the history book for one of our 106 mm Recoilless Rifles. How do I measure or examine the weapons to create a new history book?

Worried Sgt

Dear "Worried"

You don't. The life cycle of an M40A1 Rifle is controlled by the firing history, through the compensating ring adjustments and single replacement of the vent assembly to the eventual condemnation after 2500 rounds firing. EME Manual Weapons G 139 Instr 1 gives the details of this.

There is a fatigue failure factor involved in this life span and therefore when records are lost the actual remaining life must be established to protect the operator from the accident which might occur if the life was exceeded.

This remaining life can only be established by a series of firings from a ballistic pendulum. There is only one such device in Canada and it is operated by the QAD Proof and Ballistics facility at Nicolet P. Q.

The weapon must be returned to 202 Workshop Depot who arrange the testing. It is an extremely costly procedure and everyone concerned becomes very upset.

All you can do is warn the guy who was responsible for the loss of the history book to head for the hills.

Sgt O'Sweat

Dear Sgt O'Sweat;

The side engine doors of SMP 5-ton trucks are meant for easy access for a driver to do his maintenance, and for mechanical repairs. However, the engine side door should never be left open while the vehicle is in motion. If they are left open the coolant factor of engine and transmission is partially lost, because the flow of air from the fan blades is not transferred back to cool the engine, transmission, etc, properly. Most of the air from the fan is allowed to escape through the open engine side door. So for good coolant efficiency, keep those engine doors closed at all times

Sgt JH Neven (RCEME)
4 OFP

Dear Sgt Neven;

The old soldiers who were trained to this situation with the SMP vehicles during the Second World War are fast disappearing and their maternal instincts, long taken for granted, can no longer be counted as an automatic asset.

Do you think a warning decal should be placed beside the door or could the present day driver be trained to figure out this basic requirement for himself?

Sgt O'Sweat

Dear Sgt O'Sweat:

There is some conjecture as to whether the relief valve adjustments on page 427 of TM9-2320-211-35 also apply to wrecker M543. We realize that TB9-2320-211-12/1 has been superseded by TM9-2320-211-10 and 20, but does TM9-2320-211-35 fully supersede the adjustments listed in para 37, page 21 of the TB?

There is a difference in pressure and procedure.

Ssgt H Noel

RE-ORGANIZATION OF UNIT MAINTENANCE IN BRIGADE HEADQUARTERS

[This article has been paraphrased from a brief submitted by SOMM (Maj Yarymowich) of 4 CIBG. It is presented here as a suggestion, and to elicit comment and opinion from readers. -Editor]

A re-organization of unit maintenance in the Bde HQ is proposed to provide better service to the vehicles and weapons of the HQ and units normally located at the HQ. Individually, neither the HQ nor the Signals, Provost or Dental units warrant holding maintenance equipment such as a wrecker, unit inspection and repair kit truck, welding shop, lube trailer, generator set and other maintenance tools and equipment found in larger units. Combined, they account for some 230 vehicles and over 400 weapons.

These units now have a total of 15 maintenance personnel equipped with hand tools only. The tradesmen are vehicle mechanics and electrical technicians, who work in four separate groups. Consolidation of all maintenance personnel and resources in one group would provide better and more efficient maintenance support for the units concerned. These advantages would accrue due to the larger group warranting a greater variety of labour-saving equipment and tools (power operated), tradesmen of other trades (metals and weapons technicians), and a higher level of technical supervision. The addition of a recovery vehicle would ensure more intimate and immediate support for the HQ complex.

The proposal for re-organization includes an increase of one vehicle mechanic plus a supervisor of WO 2 rank, as well as a metals technician and a weapons technician. The increase in vehicle mechanics is accounted for in part by the addition of 4 APCs. The addition of "LAD-type" equipment will contribute to better and more efficient support.

(Sgt O'Sweat continued)

Dear Staff:

Here's the expert word: 1200 psi is the proper setting for the relief valve on your M543 5-ton wrecker.

Since you mentioned there's some argument - or, at least, a difference of opinion - on this point, I double-checked with the Army Tank-Automotive Center in Detroit to get the absolute latest word.

The 1200 psi setting in para 350. page 427, TM9-2300-211-35 (Sep 64) does supersede the 1350 psi setting in TB9-2320-211-12/1.

Sgt O'Sweat

Dear Sgt O'Sweat;

I have a problem and I was wondering if you can help me. My brother is a vehicle mechanic corporal who used to be with 7 Fd Regt. I say "used to" because the last letter we had was not dated and he may be posted by now. All the letter had was a four-figure number in the top right corner of the page. What did he mean?

GMD

Dear GMD;

Your brother seems to have developed a good habit! You see, as a corporal vehicle mechanic in his unit he is responsible for completing the accounting copy of the 'repair bills' commonly called 2149s in the army. These bills are machine processed to record the cost of repairs to military equipment.

Each of these bills must be dated in such a way that the computing machine can understand. The date used is called the Julian Date and is placed in the top right corner of the "services requested" block immediately to the left of the "total hours" block on the 2149.

The Julian date is a four-digit number consisting of the last digit in the year, followed by three digits representing the day in the year. The days in the year are numbered consecutively from 1 Jan to 31 Dec starting with 001. In a normal year (eg 1967) 1 Jan is written 7001 and 31 Dec is written as 7365. So you see your brother's letter was dated after all.

Sgt O'Sweat

Thirty days hath September .....

By Major GD Savage

While considering my new 1967 calendar the other day, the thought struck me that this business-like chart, with its precise division of the year into months and days, masked something more than a drab wall. Behind it is a fascinating history.

Calendars have absorbed over the centuries many hours of medication, observation, and scientific and mathematical study. They have taken many forms and still do. They have been the source of arguments and the instruments of politics. People have manipulated them, and I suspect calendars have done the same to people. Napoleon, for instance, is supposed to have said, "Ask anything of me but time".

The problem with a calendar, of course, is the difficulty in bringing days, weeks, months and the year into a system with a common denominator. Weeks and months are decreed by convention; days and years are decreed by nature.

But even the natural, or solar year, does not fit into a tidy number of days, being 365 days, 5 hours, 48 minutes and 46 seconds - almost 1/4 of a day over.

The solution to this problem was to introduce a new problem called "the civil year". It is based on convention. Generally, most races have attempted to devise a calendar that would provide two basic requirements: division of the year into months of approximately equal length, and a 'civil year' having a fixed start point in the natural year. This latter point is generally measured from an equinox or solstice.

Many variations and compromises resulted. The moon, for instance, with its regular and easily-discernible phases suggests strongly that it is a good natural timekeeper. But it no more fitted the solar year than did the period of a day. Its cycle averages 29 1/2 days, so that 12 cycles or lunations fall short of the natural year by about 11 1/2 days. This did not prevent a number of races from introducing the moon into their calendar, thus making it a 'solar-lunar' calendar.

An interesting solar-lunar calendar in use today is the Jewish Calendar. You will get an idea of its complications, however, from the following table which shows for the years 1962 to 1967 the date (by the Julian calendar) of the Jewish New Year and the number of days in the Jewish year:

Jewish Year		No of days in the Year
30 Sep 1962	-------	355
to		
20 Sep 1963	-------	354
to		
8 Sep 1964	-------	384
to		
27 Sep 1965	-------	353
to		
15 Sep 1966	-------	385
to		
5 Oct 1967	-------	

It all averages out every 19 years.

The early Mayans used a different approach to the problem of reckoning time. Their year was 365 days without variation, broken down into 18 months of 20 days each. An extra five days were merely added at the end of the year. The quarter day was ignored, with the result that any fixed calendar date would pass through all the seasons as time progressed, (It takes approximately 1500 years for any given solar and Mayan calendar dates to return to coincidence). The Mayans settled the problem by redesignating the occasion as required to a new date in the correct season!

Relating this system to our calendar, if we did not have leap years, the first day of winter being 22 Dec this year, would be advanced one calendar day each four years. It would then move through every date in our calendar, being kept in the correct place in the solar season. (In 750 years, for example, the first day of winter would be in June).

But I am digressing. The digression is intentional; to show that there is obviously more than one way to construct and use a calendar, and that 'the calendar' is not a very specific term.

'Our' calendar, which is the one in use in all European countries today and used side-by-side with other calendars in many places (China, for one), was originally based on a solar-lunar calendar in use in the pre-Christian Roman Empire. It still shows the marks and scars. Before 153 BC the new year started on 1 March. Try your memory for Latin on the names of the fifth to tenth months: Quintilis, Sextilis, September, October, November and December. Quintilis and Sextilis were later renamed for a pair of VIPs from those days, Julius and Augustus. There is even controversy over the fact that these two names were given to two of the longer months, or that the months were intentionally re-established as 31-day months because of the vanity of these two Caesars!

The name 'calendar' itself is an inheritance from the days before Julius Caesar. The Empire used a solar-lunar calendar as I mentioned earlier. A procedure associated with this system and regulated by a group of men called the "pontifices", required them to observe the first appearance of the new moon. From this occurrence the length of the new month was calculated and proclaimed. This proclamation was called the monthly 'kalendae' or 'callings'.

The pre-Julian calendar, associating lunar periods with the solar year, required regular adjustments. In this calendar, an extra month had to be inserted (or a month repeated) at fixed periods of time to compensate for the 11 1/2 days difference between 12 lunar months and a solar year. These adjustments are called 'intercalations'. Unfortunately, the intercalations were subject to political calculation as much as to scientific calculation. The frequent but not always predictable or correct adjustments resulted in a confused state of things in the calendar business. Julius Caesar formed what is today's equivalent of a Royal Commission, and put Sosigenes, a learned astronomer, to work on a reform of the calendar system.

In 45 BC, the civil year based on the lunar year was replaced by one based on the solar year. Caesar ordered the necessary adjustment to bring the civil and solar years into coincidence, performed the intercalation in the year 46 BC, and also added 67 days to make that year 445 days long. Thenceforward, he proclaimed, "30 days hath September ... etc." Sosigenes had come up with a formula that, for the times, must be considered good. Every fourth year was to be a leap year. But the Julian-proclaimed calendar was averaging an error of 11 minutes and 14 seconds a year. The calendar was running fast! It was gaining a day every 128 years.

I suppose it took some time for the error to become apparent. Anyway, it was the 16th century before another important change was introduced. Its author was a learned man of Naples, Aloysius Lilius. The change was put into effect by a papal decree issued by Pope Gregory XIII in 1582. He returned the vernal equinox to 21 March by declaring that ten days be dropped from the calendar, the 5th of October being reckoned as 15 October that year. He also ordered an adjustment to 'slow down' the calendar. This amounted to ordering the leap year to be suppressed on all years ending in -00, except where such year was a multiple of 400. Almost all Christian countries use this Gregorian or New Style calendar today. Without the adjustments of 1582, we would now be 13 days 'fast', or ahead of the solar year. The fact is, there is still an average error of 26 seconds per year. This amounts to one day in 3323 years. There is a proposal that leap year should be suppressed in all years that are multiples of 4000 (all of them!). This fine tuning of the calendar would keep the variation with the solar year within one day for 20,000 years.

The church's interest in calendar reformation resulted in great measure from the need to determine the date on which Easter Falls.

The Council of Nicaea in AD 325 decreed that Easter should be celebrated on a Sunday; it involved the solar year, since the vernal equinox was the start point for the calculation, and also introduced the lunar month into the problem because the feast day is dependant on the paschal moon. The information which Pope Gregory XIII required to fix the date of Easter obviously engendered considerable study and it is not surprising that a calendar reform resulted.

The 'fine tuning' of the Gregorian calendar is not the last to be heard of calendar re-

formation. Within our generation we find two earnest proposals for reformation, one based on identical months and one based on identical quarters.

The former is the International Fixed Calendar, tabled in the League of Nations in 1931. It sought to introduce a calendar of 13 identical months, each of four weeks, an even 28 days. 'Year Day' following the last day of December would not count as a day of the week, and in leap years, another intercalary day would be added in the summer. The name proposed for the 13th month was 'Sol' and it would come between June and July. The chief proponent of this calendar was an Englishman, Moses Cotsworth, who died in Vancouver, BC in 1943.

The proposal for change based on equal quarters appears to have more backing. Each quarter would have one 31-day month followed by two 30-day months. Saturday, the 30 December would be followed by an intercalary day without a week-day name, and New Year's Day would always be on Sunday. Leap year would add another day without a week-day name after Saturday 30 June. The first of July would always be a Sunday.

It is obvious the calendar is not by any stretch of the imagination an institution fixed for evermore, or even universal in its acceptance.

However, as I said in opening, behind the calendar on my wall is a fascinating history, the outcome of which is that my 'Playboy' calendar is delivered to the office rather than my home. The details of that history, though, would not be of general interest.

Ssgt LH Rowell and Miss June Wilson

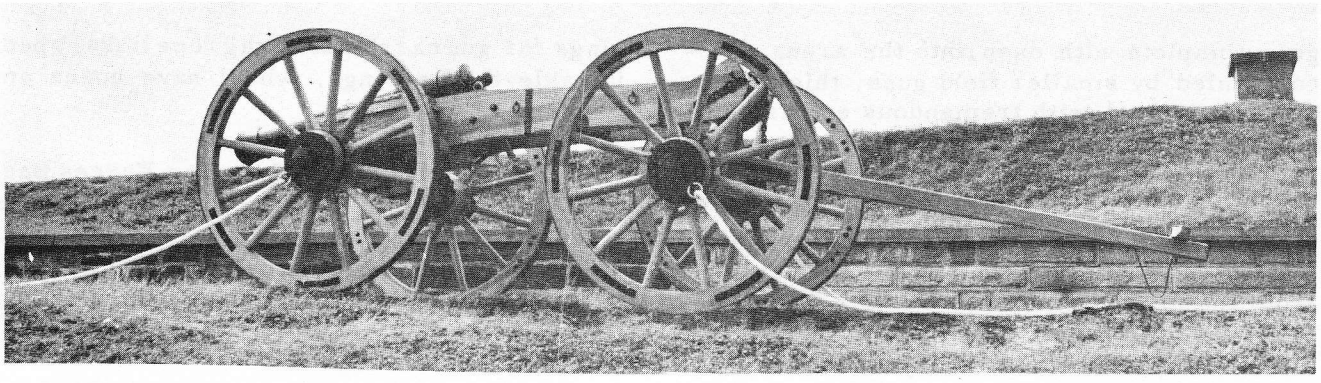
LMM CHRISTMAS PARTY

The Land Materiel Maintenance (ex DEME) Annual Christmas party was held at HMCS Carleton, Dow's Lake Ottawa on 20 December 1966. This function, which has been repeated for many years was again an enjoyable success.

The staff of Land Materiel Maintenance was joined in the festivities by many serving and retired people employed and living in the city. Many old anecdotes were re-told and no doubt many new ones added during the party. It is hoped that this pattern can continue in the future.

WO1 CG Ashdown LMM and WO2 D MacLeod LMM hard at work.

WO2 WE Davis, LMM and FS CR Laing, DEM, winner of special hamper.



Rebirth of a Gun Long Gone

Where could one obtain four British 6 pounder field guns and limbers circa 1790, complete with touch hole, that could fire a blank charge in a most realistic fashion?

This unique and most difficult request to fulfill came up recently to the Director-General Centennial, the Division of the Canadian Armed Forces responsible for the staging of the Canadian Armed Forces Tattoo. The Tattoo, a colourful spectacle will provide the ultimate in military entertainment within the framework of the development of Canada's Armed Forces from their French and British origins to our times and will appear at some 40 locations across Canada during Centennial year. Heavy emphasis will be placed on music, pageantry, colour sweeping spotlights, authentic vintage uniforms, weapons and accoutrements, history, action, comedy and fantasy.

One of the Tattoo's scene entitled "A Naval Gun Race" was the cause of this unusual requirement. History has it that for hundreds of years the Royal Navy has landed guns in support of the Army: 1759 - Quebec; 1857 - Lucknow, 1899 - Ladysmith, 1900 - China; as well as in innumerable places during two World Wars.

During the South African War, guns from Her Majesty's Ship "Terrible" and Powerful" were mounted on bulks of timber, fitted with axles and wheels, then hauled into action by oxen. Where obstacles impeded progress the Bluejackets manhandled the guns with ropes and tackles until the oxen could resume their task.

At the Royal Military Tournament held in 1900, seamen from HMS "Powerful" took a

Mrs Helen Hiseler, Miss Madeline Beauchamp, Miss Marlene Anderson, Mrs Jane Butler and DC Paterson.

gun, complete with oxen, into the arena. Accompanied by smaller field guns, this display was received with tremendous enthusiasm. Since then, the display has become an established feature of the Royal Tournament.

The selection of this armament for Tattoo proved to be quite a problem in logistics right from the start. Namely, just where do you obtain four field guns and limbers of this vintage still in mint condition? You just don't and the only solution is to make them.

In March 1966 the problem landed on the desk of Captain LG Ramsey of the Directorate of Armament Engineering Land (DAEL), Canadian Forces Headquarters. The request was "to deliver four complete 1790 British 6 pounder field guns, limbers and blank charges by September 1966 to Canadian Forces Base in Esquimalt, British Columbia, so that training could commence for the show which was to get on the road in March 1967".

For the start, John Muller's Treatise on Artillery 1793 containing drawings by William Rudyard was obtained. This 18th Century Treatise, a masterpiece of its day, had to be interpreted in terms of 20th Centruy manufacturing techniques. The process of "felling of oak trees and leaving them in the bark for six months to dry" was obviously out of the question. The Director-General Centennial needed his four guns in four months. Where, in 1966, can dry oak planks measuring 11 feet by 18 inches by 4 inches be found?

Within six weeks, with the interpretation of the treatise by Captain Ramsey and Mr Bob Lefebvre draughtsman of DAEL, manufacturing drawings had been completed using the written text and ancient accompanying descriptions of the Rudyard drawings.

Where are the wheelwrights of yesteryear? The blacksmith that can forge ornamental trappings for gun carriages, drag rope links, special axle-tree springs, wheel nave boxes and lynch pins?

The search led to The Canadian Forces Base in Halifax. There, still plying the ancient trades of their fathers were men who could still make a wooden gun wheel and produce iron trappings for a field gun used in the Siege of Quebec from the forge.

Production of the gun carriages and limbers is underway at the Dockyard and the shops have taken on an 18th Century atmosphere with the blacksmiths forge and hammer silencing the modern machinery. The wheelwright is once again called upon to cut and fit by hand.

The original brass casting for the six pounder gun itself weighed 600 pounds. However, guns of this excessive weight could not be used in the Tattoo. Because of light weight and durability, aluminum was chosen for the barrel. These muzzle loaders are being manufactured by the Defence Research Board at the Canadian Army Research and Development Establishment, Valcartier, Quebec. They are approximately 4 1/2 feet long and 9 inches in diameter at the cascable. A steel sleeve is being fitted into the barrel through its length and the Research Establishment has designed a blank charge, a fuse for the touch hole and portfires, so that the guns may be fired in a most realistic manner.

The equipment including carriage and limber when hooked up into the travelling position will be approximately 20 feet in length, be manned by 16 naval ratings and will be almost an exact replica (with the exception of the barrel material) of the field guns which pounded across the face of Europe and the corduroy roads of Canada 175 years ago.

-DG Centennial

Happy Hour -
An alcoholic partial reimbursement of excessively high mess dues.

Administrative Officer -
One who does unimportant things for important people.

Chain of Command -
Route followed by the passing buck.

Completed Staff Work -
A polished complete product that represents the compromises of all but the views of none.

Major General RP Rothschild, MBE, CD, Explains Operation of Command on Integrated Basis ... Responsibility for Implementation of Logistics Policy ... Military and Civil Personnel Number 18,000; Inventory, 919,500 Items.

Role and Function of Materiel Command

[The following is the text of part of a speech by the Commander, Materiel Command, to the 19th Annual Meeting of the Canadian Industrial Preparedness Association in Montreal on October 20, 1966. -Editor]

My aim today is to describe the role and function of Materiel Command and to take a brief look at our organization and how we operate.

The Command was formed 1 August, 1965, when the old Air Materiel Command ceased to exist. In March, 1966 the Defence Council approved a concept of operations and an outline organization for the headquarters of the Command.

Until the Defence Council's approval Materiel Command was essentially a continuation of the old Air Materiel Command, with the Naval and Army supply and maintenance systems being run by the Chief of Technical Services Branch at CFHQ.

Shortly after Defence Council approved our concept of operations on 1 April, 1966, the Naval and Army elements which ran the Naval and Army supply and maintenance systems became fully my responsibility as Commander of Materiel Command.

The main headquarters of Materiel Command is at Rockcliffe, near Ottawa.

Expressed in the briefest possible terms, Materiel Command's role is to provide logistic support to the Canadian Forces on a world wide basis. To do this, a single integrated logistics system is being developed to replace the Navy and Army and Air Force systems. It should be stressed that our future system will be designed to support the other Commands in peace and in war, not to make life easy for the logisticians.

Logistics for Canadian Forces purposes is defined as the planning and implementation of the materiel support and movement control of the Canadian Armed Forces; it includes:

a. determination of requirements, acquisition, storage movement, distribution, maintenance and disposal of materiel;
b. movement of personnel;
c. operation of materiel support facilities;
d. acquisition of supply services.

It excludes:

a. design engineering, and development;
b. personnel service;
c. accommodation.

There are four levels of logistic service in the Canadian Forces.

THE WHOLESALER LEVEL

Third line is often referred to as the "wholesaler level", and covers all logistics services that are beyond the capability or authority of a base and which are provided for the base by another agency.

In supply, these services are provided by Materiel Command or a non-Canadian Forces agency such as the Canadian Government Supply System within the Department of Defence Production. Services performed by civilian contractors, if the contract is arranged and administered by Materiel Command are, by definition, third line.

The seven main functions which evolve from the role of Materiel Command are:

First, to provide maintenance engineering for all the equipment that exists in the inventory of the Canadian Armed Forces. This

maintenance engineering includes such activities as modifications and product improvement.

The second is to operate a materiel provisioning program. Materiel Command is responsible for the provisioning of all items in Canadian Forces inventory with the exception of certain restricted items which are controlled by Canadian Forces Headquarters.

The third, concurrent with materiel provisioning, is that we must provide quality assurance for those items which we purchase under our provisioning program. This function includes such activities as the inspection of items in production, in contractors' plants, and the assurance that the materiel that we receive is in accordance with the specifications referred to in our contracts and orders.

Fourthly, we are required to operate a warehouse program. We are responsible for the control of over 900,000 items in the Canadian Forces inventory, most of which, at one time or another, passes through our warehousing system.

Fifth, we must administer a material distribution and transportation system. The logistics staff of Materiel Command are responsible for the control of the issue of material from stock to the user. By making use of Automatic Data Processing Equipment a high portion of issue from depot stock to users can be authorized automatically. It is our intention in the future to automate as much as possible of our material distribution and control system.

Within Materiel Command Headquarters the Admin and Tech Services Branch has a special role to play in transportation, in that it maintains a Forces-wide surveillance of surface movements of material. To do this, Materiel Command must co-ordinate all sea shipments overseas including resupply of military installations in the Arctic.

In addition, although service air transportation is the responsibility of Air Transport Command, the two Commands work very closely together in developing the best methods of packaging for air shipment in the joint research of materials, handling requirements, and development of the procedures, for the efficient use of air transport.

Sixth, Materiel Command is required to operate a program for major repair and overhaul. We must ensure that proper facilities are available for repair and overhaul of equipment, and if the repair is beyond the capability of the services, arrange for civilian contract. Our logistic staff determines which items are economically repairable, estimates repairable arisings and monitors repair activity. Furthermore we draw up the standards and procedures for servicing, repair, and overhaul of all equipment in the Canadian Forces inventory and provide directions for those who are to work on the equipment.

Seventh, since all good things have to end we must operate a materiel disposal program. Disposal action is initiated when it has been determined that a major equipment will be phased out of service, either through a change in the operational requirement or through the equipment having been replaced as a result of technological advances or simply because it is worn out. The staff of the logistics branch is responsible for the progressive reduction of system surplus to avoid the unnecessary expenses of storage and handling of material which is no longer needed in the Canadian Forces. I am sure you will appreciate that when a new replacement tank, for example, is introduced into service, adequate spare parts for the old type, until it is declared surplus, have to be maintained so as not to jeopardize our operational effectiveness. Therefore, no matter how much advance notice we have and regardless of how much care is given to our calculations, we will always be faced with a large scale disposal program. Equipment must be examined for possible alternative uses within the Canadian Forces or other government departments. If no use can be found, the equipment is put up for sale through the Crown Assets Disposal Corporation.

RELATIONSHIP, CFHQ, OTHER COMMANDS

I wish to relate our operations with those of CFHQ and the other commands.

The Canadian Forces are organized functionally, reflecting the major military commitments accepted by the government. Under this concept all forces directed towards a pri-

mary mission are grouped under a single Commander who is assigned sufficient resources to discharge his responsibilities.

At each level of Command there is a designated Commander who is responsible and accountable for the effective discharge of his assigned mission. This responsibility cannot be delegated and normally a staff is provided to assist and act on behalf of the Commander. The staff are not, however, authorities unto themselves. In the organization of the Canadian Forces Headquarters, the Chief of the Defence Staff is primarily responsible for the implementation of the Defence Commitments assigned by the Canadian Government. To effectively carry out the responsibility given to the Chief of the Defence Staff, CFHQ is divided into four functional staff branches.

IMPLEMENTATION OF LOGISTICS POLICY

Materiel Command is responsible for implementing logistic policy. The latter is provided by the Chief directly under the control of the Chief of the Defence Staff and not the CTS. The Chief of the Defence Staff has various Commands and formations working for him. The operational functions of the Canadian Forces are vested in Maritime Command, Mobile Command, Air Defence Command, 1 Air Div and 4 CIBG. The support functions are carried out by Training Command, Materiel Command, Air Transport Command and the Canadian Forces Communications System. A special function for the reserves and emergency measures rests with the Deputy Chief Reserves.

The Commanders of the various Commands are the next organizational level below CFHQ and are responsible to the CDS for the efficient and effective discharge of their particular missions. The inter-relationship between the various Commands, and particularly between the operational and support Commands, cannot adequately be portrayed in an organizational chart; rather they must be specified in such media as policy guidance papers, procedures manuals, special instructions and so on. Materiel Command HQ is organized into four branches as follows:

The Logistics Branch performs the functional role of Materiel Command or the supply and maintenance tasks that are carried out within the headquarters. These include: provisioning, stock control, maintenance engineering, product improvement, repair and overhaul and disposal.

The Quality Assurance Branch consists essentially of the old DND Inspection Services, and the Quality Control organization of the Air Force as well as the Principal Naval Overseas organization of the Navy.

The Admin and Technical Services Branch performs administrative services and staff functions by providing staff management for the various bases and units of Materiel Command. It also provides the support services for the management of materiel by the Logistics Branch and produces the methods and the procedures for supply and maintenance for the forces. The operation of a data processing division, the identification and cataloguing of materiel, co-ordination of materiel movements, and the establishment of packaging standards and disposal of surplus materiel come within its responsibility.

The Comptroller Branch provides a service to management consisting of co-ordination of budget systems and control of allotted founds, an accounting service, financial audits and internal audits. In addition, this Branch is responsible for reviewing organization and manpower allocation; review of management techniques, development of criteria for measuring effectiveness and efficiency and for the provision of statistical services and the analysis thereof.

There is a wide variety of formations and units which carry out the main support operations of Materiel Command. Their tasks include the receipt, storage, and transportation of materiel and extensive maintenance engineering services. To do this Materiel Command has five bases and many units which are lodgers on bases of other Commands. They are:

CFB London; the main unit is 27 COD, which incorporates a large repair facility.

CFB Cobourg is situated in the town of Cobourg, about half-way between Toronto and Kingston. The main unit is 26 Central Ordnance Depot.

CFB Montreal is the largest Materiel Command Base. The major units are 25 COD and 202 Workshop Depot. There is also a Naval repair facility as well as a large Naval Supply Depot.

The base at Moncton makes up 5 Supply Depot.

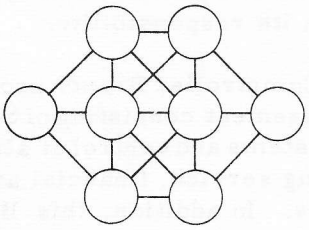
Not the least is CFB Rockcliffe, Ont, of which Materiel Command Headquarters is an integral unit.

In addition to the five main bases there are many lodgers, on bases of other Commands, such as the one at HMC Dockyard Esquimalt, BC, and the Naval Ammunition Depot at Rocky Point near Esquimalt.

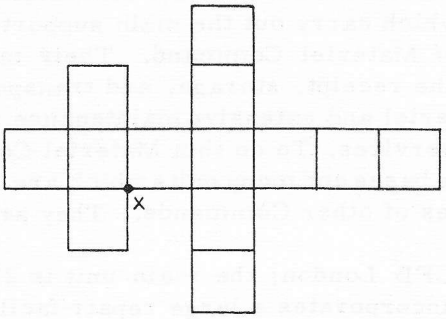
Simple or Difficult ?

Problem Set No 4.

1. The digits 1 to 8 must be placed in the eight circles in the illustration with the following restriction: No two digits adjacent to each other in serial order may go in circles that are connected by a line: ie, a 5 placed in one of the circles should not have a 4 or 6 placed in any circle joined by a line to the one containing the 5.

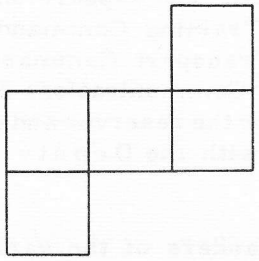


2. With one continuous straight line beginning at point X divide the cross into two pieces of equal area. Show a proof using elementary geometry, and involving only rational proportions - ie, rational fractions. (Note, all squares are unit area).



3. How many things do you know arrive early because they're slow? Try this. A man is given reliable information about the time of arrival of something at a place X. On this he bases an estimate of its arrival at another place, Y. He estimates its speed (a constant), but is wrong. Otherwise his information - as to the position of X and Y and the time of arrival at X - is correct. The something arrives at Y sooner than he estimates, and because the something travelled slower than he thought. Explain, with a real life example.

4. Cut the following figure composed of five squares (still in one piece) into three pieces using only two straight lines so that the three pieces may be rearranged to make a square.



5. Is five minutes enough time to solve the following equation? It should be!

$$\frac{1234567890}{(1234567891)^2 - (1234567890 \times 1234567892)} = ?$$

send any queries to:

Capt RE Betzner
Officers Mess
The Fort Garry Horse
Calgary, Alta.

BETZNER'S CORNER

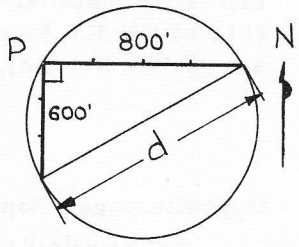
ANSWERS TO PROBLEM SET No. 3

1. The odds are 1/6 that the colonel will throw a particular number. And, the odds are 5/6 that his 2 IC will throw a different number. If the numbers are different, the odds are 1/2 that one of them will have the higher number. Since the numbers are different on the average 5/6 of the time, and in this event the higher number is tossed by one of them on the average 1/2 of the time, the 2 IC will probably throw a higher number 5/12 of the time (1/2 x 5/6 = 5/12).

2. The area of the triangle equals zero since 13 + 18 = 31.

3. In the narrative it states that all the village people had their math ability and foot size measured. Thus, a similar relation exists between math ability and foot size as does between age and foot size.

4. One must recognize the fact that a line drawn from one end of a diameter to a point P on the circumference forms a right angle with a line drawn from the other end of this diameter to the same point on the circumference.



Thus $d^2 = 600^2 + 800^2$ (Pythagarus)
and d = 1000 feet.

5. If the man constructs the roads as specified the sum of the lengths of the roads is independant of the position of the house.

6. The word having three consecutive double letters is included in the narrative: ie, bookkeeper.

7. Mrs Smith can smoke 13 cigarets. She makes three new cigarets from the nine butts and one new cigaret from the three. (9 + 3 + 1 = 13).

8. The fish weighs 40 pounds. The problem read in a slightly different manner reads: "A fish weighs half its own weight plus half its own weight; ie, 20 lb must be half its own weight. (20 + 20 = 40).

WO2 Jermey wins Suggestion Award

Col AL MACLEAN, Commandant of the RCEME School presents a suggestion award certificate to QMS WO2 FW JERMEY while MAJOR AJ MACGILLIVRAY, OC looks on. WO2 JERMEY, an electro-mechanical technician (Instruments), is currently employed as a senior assistant instructor in Armament Company. He received an award of $80 for having designed an adapter which will overcome distortion of image when using a visual cast projector and portable screen. This adapter can be easily attached to a portable screen without any modification to the screen, and will allow it to be titled forward to any angle within the limits of the adapter. The forward tilt will overcome the familar 'keystoning' effect normally encountered when the screen and projector are at different levels. This simple but effective adapter can be used with the portable screens now on issue and will be a great asset in classroom instruction.

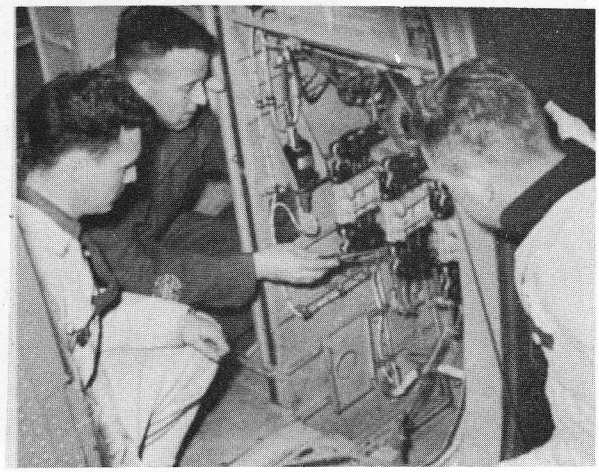
THE COMPUTER AS LIBRARIAN

THE ACCELERATED ADVANCE OF THE COMPUTER continues, and the invasion is being increasingly encouraged in German libraries. At the new university at Bochum, for instance, not only have all the books been catalogued on magnetic tape but the entire book-lending process has been so organised that a computer can instantaneously provide whatever information is required.

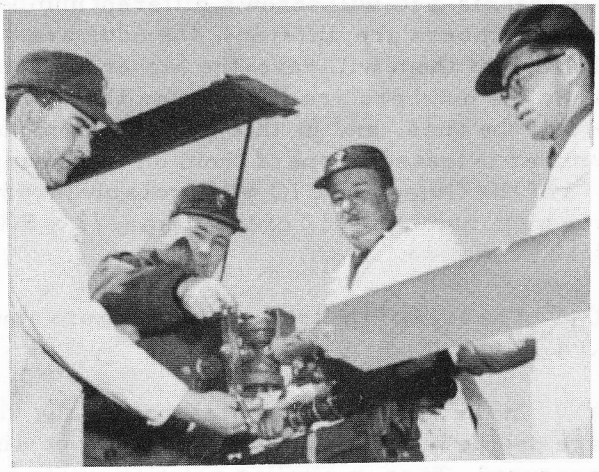
(continued on page 46)

CFB Rivers

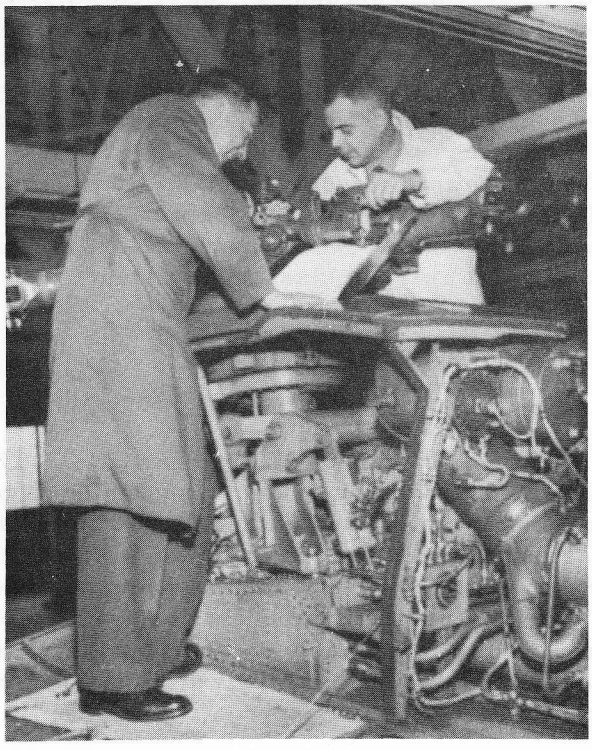
Names Make News



The control closet of a Vertol could be a plumber's nightmare. WO2 Jim Almdal demonstrating action of control valve and "sloppy link" on a hydraulic actuator. (l to r) Cfn TJ Foot, WO2 Almdal, Cpl GM Ives.



Sometimes it's done in the cold blustery winds of Manitoba. Ssgt WG Barnes teaching tail rotor installation on the Hiller helicopter. (l to r) Cfn KV Pugh, Ssgt Barnes, Sgt Stevenson (3 Bde Sve Bn), Sgt DA Cross (2 Fd Wksp)



Opposite page - top

Sgt Dowdell carries out an independent inspection as Cfn Piercy and Cfn Parrott rig the tail rotor controls of a CH112 Nomad helicopter.

Opposite page - middle

Ssgt Atkin discusses a forthcoming test run on a T58 turbine engine used in the CH113A helicopter as Lcpl Boulton and Cpl Martin assemble the engine in the test bed.

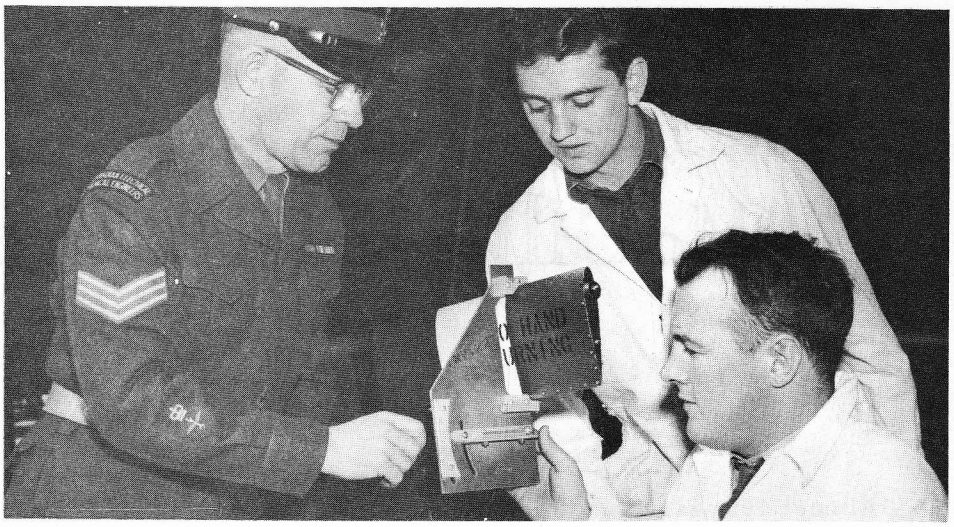
Opposite page - bottom

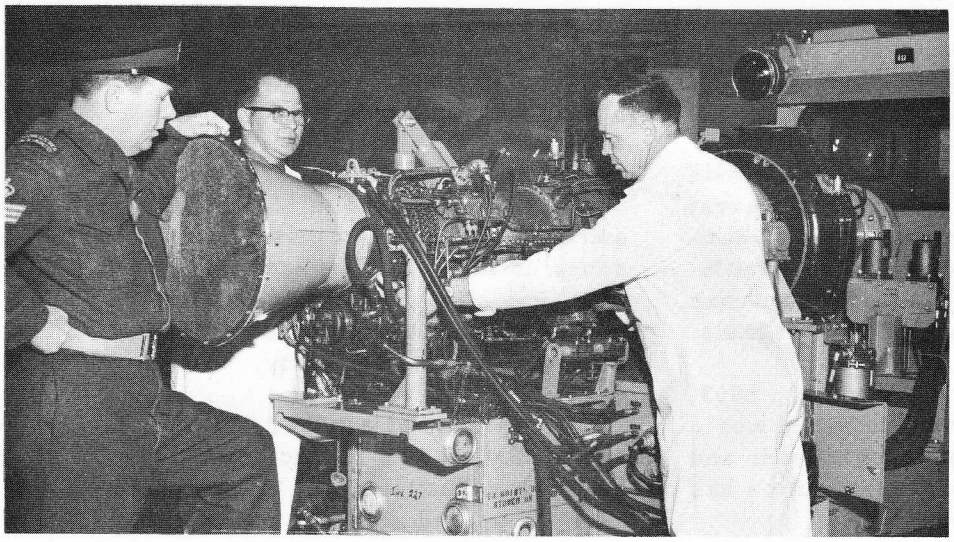
A pilot's life may depend on his radio. Cpl TA Remy teaching sweep alignment of Bendix VHF Receiver used in CH113A helicopter. (l to r) Cfn RJ Sameck, Cfn JJH Hosick, Cpl Remy, Cfn JGC Thibault.

Ssgt CJ Mooney and Sgt JT Martin examine a rotor head.

-CFB Rivers photos

These photographs were 'surplus to requirements' for the story BMU 1, CFB Rivers, in the July 66 Bulletin. Because they are good pictures of RCEME people, we decided to brighten up this issue with them.





HIGH ALTITUDE RESEARCH
PROJECT (HARP)

McGill's Place in Space

By Brodie Snyder

Almost 100 years ago, Jules Verne wrote of men using giant cannons to propel themselves into space and to the moon. That more or less is what McGill University scientists have been doing on a lonely stretch of the south coast of Barbados for the last couple of years.

The program is called the High Altitude Research Project and what makes it different is that it is exploring space using a 45-year-old naval gun. There was considerable initial skepticism to this concept but the project has produced a major breakthrough on a cost basis.

With its initial launch in January, 1963, McGill became the first university in the world to have its own space research program and just how well the Montreal-based institution has done can be judged by two things.

In the 12-month period which ended in June, 1966, McGill was a world leader--and that includes the space giants, Russia and the United States--in the number of vehicles (about 200) launched to a height of at least 100 miles.

McGill is expected to orbit a satellite in 1967, allowing Canada to join Russia, the U S and France in that exclusive club, in its centennial year. Two Canadian-built satellites--Alouettes I and II--are in space now but they were put there by the Americans.

The man who thought up the idea of using the gun is Dr Gerald V Bull, a 38-year-old pipe-smoking scientist with an easy grin who runs the operation from an office in McGill's Space Research Institute on campus in the heart of Montreal--except when he's in Barbados supervising shots, or perhaps in Highwater, Quebec, 65 miles southeast of the metropolis, or Yuma, Arizona, where other HARP ranges are located.

Dr Bull first dreamed his dream in the late 1950s and he found a kindred spirit in Dean DL Mordell, of McGill's Department of Engineering, and some others at the Ballistic Research Laboratories of the U S Army, which had done some small experiments along the same line.

Dr Bull moved to McGill, the university and the U S Army put up the first money and construction started in Barbados in 1962. Cost of HARP - budgeted this year at $2,400,000 - now is split equally between the Canadian Government and the U S Army.

The gun, of course, was the key to the whole plan. It is a 16-inch naval rifle, built in 1921 for a battleship of the U S Navy, and it never has fired a shot in anger although it was designed to hit moving targets over the horizon.

The ship for which it was fitted later was sunk by Capt Billy Mitchell in his famous experiment to show that air power had a future and the gun went into mothballs until the Second World War, when it saw some peaceful duty in coastal defence.

It was in storage at Hampton Roads, Va, when McGill obtained it and getting a 70-foot-long, 138-ton gun to Barbados posed a problem. It was mounted on railroad flat cars, lashed to the deck of a shallow-draft craft for the 2,000-mile trip. The cars were rolled off the ship onto temporary tracks on the beach and then the gun travelled over three miles of temporary roadway to the project site.

The gun - extended to 118 feet in March, 1965, to allow deeper space probes - has three crests on it: McGill's, the U S Army's and one which says simply: "For peaceful research" and was put there by the university's

principal and vice-chancellor, Dr H Rocke Robertson, when he commissioned the gun.

The reasons for the success of HARP? Says Dr Bull: "The attractions ... were the conversion of already-existing facilities to a useful role, the low launching costs and the accuracy with which one could place things in the sky and fire in a very confined space."

The existing facilities were the naval gun, which, as a bonus, allows more frequent launches than the conventional space explorers, missiles and rockets.

The low launching costs are shown by the fact that McGill's first 84 shots cost only $1,000,000, including about $2,000 for each of the Martlett vehicles, so named for the mythical bird on McGill's crest. By comparison, Alouette I cost Canada $3,000,000 to build and the U S $15,000,000 to launch.

McGill's ultimate vehicle will be Martlett IV which should be boosted into orbit with a rocket assist within two years. The cost? A paltry $50,000.

The accuracy of McGill's shots comes from the fact that the gun itself acts as a guidance and control system.

The research has been most valuable, covering such fields as the makeup of the upper atmosphere: re-entry and meteor physics; ram-jet aerodynamics; wind analysis, on which HARP has compiled the first systematic data; and a project to measure the impact effect on materials colliding at 20,000 miles per hour, which should help in the design of space vehicles which must resist collision with meteorites.

For McGill, HARP has given the univercity an international reputation in still another field and has provided unique opportunities for students and staff members in aerospace technology.

And the program continues to grow. Discussions are underway with the United Kingdom, Japan and Australia about the possibility of establishing HARP ranges in those countries.

And Gerry Bull has one other idea. He'd like to put a gun in the Arctic to study the aurora, a mystery to man for centuries.

HARP, based in Paragon House, a pink stucco plantation home set in formal gardens on the beautiful south coast of Barbados, draws most of the headlines in this age of space.

But the easternmost of the Caribbean countries means much more than this to McGill. Barbados is a virtual island laboratory for the Montreal institution.

In fact, it is doubtful that HARP would have been established where it is had it not been for the successes enjoyed by McGill's Bellairs Research Institute and Brace Research Institute and the continuing enthusiastic co-operation of the Barbados Government.

Bellairs came first, donated to the university in 1954 by Cmdr Carlyon Wilfroy Bellairs, of the Royal Navy, in memory of his wife. It is designed primarily for studies in marine biology and fisheries, using modern laboratories and a 30-foot research vessel.

McGill's Department of Geography also uses Bellairs' facilities and five acres of sugar cane fields to study agricultural meteorology and land use, with a view to future expansion of mixed agriculture to increase locally-produced food supplies.

The Barbados Government, which leased McGill the land for 50 years, is backing this work and also is interested in the fisheries research because of possible commercial implications.

Dr John Lewis, a McGill-trained biologist, is director of the Bellairs Institute.

Second of the three major McGill projects in Barbados is the Brace Research Institute, under Dr GT Ward, which is directed toward research and experimentation designed to aid in the feeding of hungry nations.

It was set up after the late Maj James Brace, of Westmount, a Montreal suburb, left McGill $2,000,000 for studies aimed at turning

the world's arid areas into fertile lands, with particular emphasis on the conversion of salt water.

Brace scientists also have designed their own devices to produce steam and hot water using solar energy and they seek to apply wind energy to irrigation projects. The objectives are to produce equipment for economic and trouble-free operation in under-developed areas and to train specialist engineers in arid land research.

The work is being carried on in co-operation with United Nations agencies and such international institutions as the Rockefeller Foundation. -MONTREAL 66

WATCH THOSE QUICK-HARDENED PARTS

Components that have been subjected to new timesaving treatment must be ground with extreme care to avoid destruction of their tough but razor-thin "skin"

Grinding crankshaft journals and other automobile parts subject to similar wear has never presented a great problem. The hardness was deep enough to withstand any reasonable amount of grinding without injuring either the surface hardness or the underlying metal. Now, in some cases, that is no longer true and the serviceman who does any grinding or has any done for him cannot afford to take chances with breaking through the hard 'skin.'

A process now being licensed in this country produces a surface hardness only .0004 to .0006 inch deep. A coarse wheel could cut through this in a matter of seconds. Should this be done, the part has to be hardened again.

NO WAY TO TELL

There is no way a shop can tell whether the particular part it is servicing has been hardened by this new method, known as Tuftriding. It is being used by some car and truck factories for a variety of parts.

The crankshaft journals of the 1964 Chevrolet 396 cu-inch engine are one. International Harvester trucks' and tractors' crankshaft journals are hardened in this way, as are the disc-brake shoes made by Kelsey-Hayes for 1966 Fords. The timing sprocket of the Pontiac overhead valve 6 cyl engine and the crankshaft journals of the no-longer-produced Willys Toronado overhead-valve engines built from 1962 through 1965 are also hardened by this method. A good many parts bought outside by car factories are so treated but identification of them is difficult to obtain. Engine rebuilders are much interested in the process.

The big reason behind the use of the new method is timesaving. Where nitriding parts used to take 50 to 90 hours, the new method requires only 5 minutes to 4 hours.

Normally, three methods are used to harden steel. Two of these entail closely controlled heat treatments. To obtain the required hardness, the steel is first heated to about its critical point. This will vary from a cherry red to white heat, depending on the analysis of the steel and the end result required. It is then cooled rapidly, or quenched.

UNWANTED SIDE EFFECTS

This gives the hardness needed, but leaves two unwanted side effects. One is a surface brittleness, and the other an internal strain in the steel caused by the sudden cooling. It is this hidden force, called residual stress, that can cause a part to fail prematurely in service, or even to crack on the shelf.

To avoid these side effects, and to toughen the steel without sacrificing the hardness a second heat treatment, called tempering, is used. This consists of heating the steel by var-

ious processes to a temperature below its critical point, and then cooling it.

Ordinary nitriding is a lengthier process but has certain advantages over the other two, especially when the parts treated are irregularly shaped. In nitriding, the part is twice heated and quenched and then left in a chamber filled with ammonia gas for 12 hours to 3 days. The entire treatment takes 2 to 4 days.

Tufftride tempers steel by means of a hot salt-bath. It is almost always done after the part has been finish-machined and undergone the first heat treatment.

The part is first heated to about 800 deg to reduce the shock to the part when it is placed in the salt bath. The bath consists mainly of cyanide and cyanate compounds heated, usually, to a temperature of 1,060 deg. The immersion time varies from five minutes to four hours, depending on the base metal, its shape, and the properties required. The part is then quenched in water, oil, or by air.

In a typical application, Tufftriding a low-carbon steel for 90 minutes develops a non-brittle compound zone, or 'skin,' of carbon-bearing iron nitride .0004 to .0006 inch deep. Directly beneath this there is, in addition, a .030 to .040 inch nitrogen diffusion zone.

This tough, non-brittle compound zone is said to increase resistance to wear, galling, seizing and corrosion. The diffusion zone forms a barrier that is said to prevent incipient cracks from spreading to the surface and causing fatique failure. Improvements of up to 500 per cent in wear life and 80 per cent in fatigue strength are claimed.

In service, minor damage to a bath-treated part can be cleaned up by polishing or honing in the usual manner. However, if the damage necessitates removing more than .0002 inch of surface depth, the part must be retreated.

Tufftride is a European development, and licensed for use in the United States and Canada. A shop wishing to have a part rehardened by the new process may be able to have it done by a licensed heat-treating plant in his area. The number of these is said to be expanding.

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SPANNER SPEAKS

To kick off this edition we'd like to offer warm congratulations to WO2 J Lucking of our RCOC Platoon on his promotion. Sergeant-Major Lucking will remain with us until he rotates next summer. Congratulations also to Lt JI Hanson of FRP who returned from Canada last week qualified for the rank of major. Unfortunately he didn't bring back any really good rumors from the RCEME School.

The golden haired boys around the shop lately are, of course, our golfers. Capts Rochefort and Code, WO2 Kutyik and Sgt White made us the BAOR Unit Golf Champions. Although we may kid our golfers from time to time, we're really proud of them, even when they lose (only they never do).

Once again it's Annual Agony time at 4 Field Workshop and CSM Clarke is driving us through refresher training. The buildings tremble with the snores of mighty hosts dozing through Mil Law lectures, and the ground shudders with the stomp and crunch of many-soled, iron-bound boots. The grand finale comes today, with a CO's parade, and then it's all over for a while.

To close, we'd like to pay tribute to some of the most reviled and honoured members of our unit. These are the men that make up the RCEME inspection teams, those mechanical marvels who spend most of their time thrashing through the boondocks checking on the standard of unit maintenance around the Brigade. They are reviled by the poor technicians, because the inspectors reveal their lack of skill and drive them to improvement. They are honoured by their fellows at 4 Field Workshop because, when they are out yonder, the rest of us don't have to go. Keep up the good work, inspector!

-The Beaver

HOW TO LICK STRANGE ENGINE SEIZURE

THESE TIPS TELL HOW TO CORRECT TROUBLES CAUSED BY HEAT-SOAK AND IDLE-HEAT

TROUBLE WITH PROGRESS

Today's engines are many times as efficient as their ancestors, but the high speed and high compression that makes modern performance possible bring new problems of their own.

The intense heat generated by long, hard driving or lengthy traffic jams creates conditions that have come to be known as heat-soak and idle-heat. The mechanic's first encounter with these conditions can be baffling--unless he is lucky enough to have read this revealing article.

Changing driving habits and patterns required by today's superhighways and congested city traffic create new engine problems that can puzzle a mechanic not familiar with the cause.

Two such problems, that have become important only in relatively recent times, are "heat-soak seizure" and "idle-heat seizure." Both can occur without warning on an otherwise healthy engine.

Often mistaken for a dead battery or defective starter, engine seizure of this type can develop during a few minutes' stop after an extended period of high-speed driving or during prolonged engine idling in bumper-to-bumper traffic.

Hard starting, caused by vapor lock after a "hot soak" interval, is well-known to road-service mechanics. But heat-soak and idle-heat seizures result from an intensification of the conditions that also cause a vapor lock.

The engine is unable to throw off the intense heat after being shut off following a long high-speed drive or during prolonged idling, since the cooling system is circulating too slowly or not at all and no cooling air stream rushes past the engine of a parked car. The result is a tremendous heat build-up that penetrates every component of the engine, not only the fuel system.

Of course, the situation is aggravated by the extremely close tolerances in high-performance engines, particularly between the pistons and cylinders, and the elevated heat in the piston-ring area--the hottest part of the engine outside the combustion chamber.

Engines with about 20,000 miles on them are usually most subject to this trouble. A good deal of carbon has been built up which, combined with resins and varnish that act as binders for the carbon, forms hard deposits in the ring-land area, reducing the already minute clearance. Expansion from an overheated engine finishes the job and temporary seizure occurs.

Conventional engine seizure was once a

dread automotive disease along with a cracked block, broken crankshaft or thrown rod and the benediction "there goes the engine," was pronounced. But this new brand of engine seizure does not call for a complete engine tear-down and a major repair job.

A repairman's introduction to this trouble usually takes place under these circumstances.

A road call for help will be received from an owner because his car won't start. The front-seat mechanic will be sure it is a dead battery or a broken starter. The car will probably be located at a turnpike rest stop or in the midst of a bumper-to-bumper traffic jam--in or out of the city.

On the repairman's arrival the complaint will be heard that "she refuses to turn over for no reason at all--it was running swell up to now."

Of course, the mechanic will first check the oil level, the cooling system, the battery and the starter. If all these are in good shape, the chances are heat-seizure is to blame.

If this seems to be the case, the engine should be allowed to cool down normally. Then, if it does not turn over easily with the starter and it has been determined from questioning and observation that there is no internal failure of engine parts, the following simple operations should be performed to break the engine loose before a complete engine tear-down is attempted.

All the spark plugs should be removed. Then about 2 oz. of a suitable upper-engine solvent or cleaner are poured into each cylinder. This can be the type of solvent commonly used to dissolve carbon and free-out sticky valves.

Heat Speeds Action

The dissolving action of the cleaner will be stepped up by keeping the car in 70 to 75 deg temperatures. It will not work well in low temperatures.

After the waiting period, an attempt should be made to break the engine loose with a fully charged battery, without replacing the plugs. This will allow the solvent and loosened deposits to be blown out through the open plug holes. If the starter fails to turn the engine, a small pry bar should be used on the flywheel gears.

If the engine still remains frozen, more solvent should be added and allowed to work for another 24 hours.

Remove Excess Cleaner

After the engine finally turns over it should be cranked for a few moments with the plugs still out to remove excess cleaner and loose deposits. Then the plugs should be reinstalled and the engine started. After it is running normally, a can of the solvent-cleaner should be poured very slowly into the carburetor to prevent the engine from stalling.

The engine is then shut off and, after about five minutes, the crankcase is drained and refilled with a thin grade of engine oil. The engine is run again slowly until it reaches operating temperature and then the crankcase is drained again to flush the lubrication system. At this time, the oil filter is changed and the filter-retaining can, if that type is used, is cleaned out.

This time the crankcase is filled with the proper grade of engine oil for the car. The car is ready to be turned over to the customer. But, although the engine is running, there is the makings of a carbon-cleaning job, and cooling-system servicing.

A condition of partial engine seizure may be encountered under the same general circumstances, evidenced by extremely slow engine turnover. Again, it could be mistaken for a weak battery or high resistance in the starter circuit, when the engine drag is really caused by carbon deposits in the engine that reduce piston-to-cylinder clearances.

To check for this condition, the plugs are removed and an attempt is made to turn the engine by the fan. If the engine cannot be turned over by this method, there is excessive drag in the cylinders.

The engine should be given the same type of solvent treatment as already described.

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WHO'S WHERE

LOCATION OF RCEME WARRANT OFFICERS

Class 1

Almey	B	LETE
Ashdown	GG	Ld Mat Maint
Baynes	CH	CBUE (23 Wksp REME)
Boisvert	L	Que Dist Staff
Brown	AT	HQ Trg Comd
Buck	WM	CFB Borden (14 Coy)
Campbell	DN	RCEME School
Coles	JC	CFB Gagetown
Cunningham	JM	202 Wksp Depot
Dagenais	EJ	LETE
Deans	AG	CFB Calgary (13 Coy)
Dodds	TH	RCEME School
Doherty	E	202 Wksp Depot
Drew	CV	DGOS
Drobot	W	CFB Valcartier (5 Coy)
Dudley	J	D Org
Elliott	WEC	CFB Shilo (212 Wksp)
Foley	HEF	CFB Montreal (4 Coy)
Gavriloff	N	Ld Mat Maint
George	AG	202 Wksp Depot
George	LJ	FGH Maint Sec
Gladwin	CH	CADEE
Guilfoyle	ME	CFB Toronto (2 Coy)
Hanash	J	CFB Calgary (229 Wksp)
Hayes	JW	Ld Mat Maint
Henry	JE	CFB Chilliwack (214 Wksp)
Houlton	VH	Ld Mat Maint
Hurd	LR	Ld Mat Maint
Jackson	AF	DEM
Keech	HL	Ld Mat Maint
Knowles	GA	RCAC School
Landry	JL	CFB Valcartier
Lee	KA	202 Wksp Depot
Leonard	WV	CFB Borden (14 Coy)
Lewis	SM	27 COD
Lowry	LH	Hq Mat Comd AV/PC
MacDonald	DJ	Ld Mat Maint
Mahood	NEH	CFB Rivers
Mallett	JC	DGCES/DESE
McElroy	JC	2 Fd Wksp
McGovern	PMJ	LETE
McInnes	DM	CFB Winnipeg (213 Wksp)
Meloche	JB	CFB Petawawa (8 Coy)
Mercer	JL	RCEME School
Myatt	WC	CFS of Management
Norbury	G	UNEF ME
Owen	LR	RCD Maint Sec
Rawling	GW	DEM
Rivers	AM	RCEME School
Robertson	WG	CFB Kingston (207 Wksp)
Rowe	AW	RCEME School
Rutherford	FA	CFB Rivers
Schleihauf	GH	DGOMC/DMPC
Silzer	J	RCEME School
Sinclair	L	C Ont Dist Staff
St Pierre	G	LdSH (RC) Maint Sec
Stever	JD	DGOS/DCSE
Stringer	AJ	1 Fd Wksp
Szumlanski	J	RCEME School
Thivierge	AJ	DGOS/DARME
Walsh	IS	4 Fd Wksp
Warren	DH	202 Wksp Depot
Wilson	RR	CFB Halifax (6Coy)

Class 2

Ablett	JA	4 Fd Wksp
Adams	RJM	RCEME School
Alexander	LW	4 RCHA Maint Sec
Allen	EB	CFB Winnipeg (213 Wksp)
Allen	FT	RCEME School
Allen	JJ	202 Wksp Depot
Allen	WG	CFB Winnipeg (213 Wksp)
Almdal	JT	CFB Rivers
Anderson	SB	RCEME School
Armstrong	RWF	Ld Mat Maint
Arscott	NL	RCEME School
Asham	OM	27 COD
Atkins	JW	RCEME School
Babb	CH	DEM
Bailey	E	3 RCHA Maint Sec
Baldwin	TW	202 Wksp Depot
Balmer	AJ	CFB Esquimalt
Banks	WE	2 RCHA Maint Sec
Barker	NG	DGCES/DESE
Barnhardt	JB	2 PPCLI Maint Sec
Barnes	WG	HQ Mobile Comd
Barrett	GJ	RCEME School
Bateman	NFK	1 CIBG
Beeson	EG	202 Wksp Depot
Bellefontaine	AEL	CFB Halifax (6 Coy)
Betcher	WL	4 Fd Wksp
Bingham	HC	202 Wksp Depot
Blackmore	HE	RCEME School

Class 2 cont'd

Blair	WE	Ld Mat Maint
Blair	R	CFB Montreal (4 Coy)
Blanchard	JM	CFB Petawawa
Blanchette	EEJ	C Ont Dist Staff
Bowles	JA	202 Wksp Depot
Boon	J	Ld Mat Maint
Both	TA	CFB Edmonton (215 Wksp)
Bottle	DA	CFB London (1 Coy)
Boudreau	JIF	RCEME School
Boutillier	AE	202 Wksp Depot
Bovey	ET	RCEME School
Broadbent	WH	202 Wksp Depot
Broomer	TF	RCEME School
Brown	AW	CFB Winnipeg (212 Wksp)
Brown	RG	UNEF ME
Burgess	EW	CFB Gagetown
Burns	HS	CFB Montreal (4 Coy)
Cameron	FR	2 Cdn Gds Maint Sec
Cameron	RJ	202 Wksp Depot
Cameron	WE	27 COD
Campbell	AM	8 CH Maint Sec
Carefoot	WN	202 Wksp Depot
Carr	AJJ	CFB Montreal (4 Coy)
Carver	AE	RCEME School
Celli	AJ	RCSA
Clarke	AL	4 Fd Wksp
Clinton	WFD	CFB Valcartier
Clooney	RT	RCEME School
Colbridge	DW	27 COD
Colson	AR	CFB Kingston (210 Wksp)
Coughlan	GH	202 Wksp Depot
Coughlin	AF	CFB Gagetown
Cross	RC	1 RHC Maint Sec
Crosson	JH	CFB Borden (14 Coy)
Curran	RJ	RCD Maint Sec
Currie	WR	CFB Rivers
Cyr	C	HQ Mobile Comd
Dainty	WH	CFB Petawawa
Dand	RJM	Ld Mat Maint
Darton	FA	CFB Montreal (4 Coy)
Davis	WE	Ld Mat Maint
Dillon	JB	202 Wksp Depot
Dinner	A	RCEME School
Dorey	EE	27 COD
Doubleday	EG	1 Fd Wksp
Drake	EA	CFB Halifax (6 Coy)
Dyck	D	2 R22R Maint Sec
East	SW	CFB Toronto (2 Coy)
Einarson	GE	UNEF ME
Eno	JB	CFB Borden (14 Coy)
Evans	RL	CFB Winnipeg (212 Wksp)
Fairchild	R	CFB Rockcliffe (208 Wksp)
Farnsworth	FA	202 Wksp Depot
Ferguson	HG	1 Cdn Gds Maint Sec
Fielding	C	27 COD
Fitzgerald	EJ	FGH Maint Sec
Fourcaudot	C	CFB Valcartier
Frankovitch	M	RCEME School
Fyke	JH	B Coy 3 R22R
Gall	GJ	CADEE
Gill	DE	DGOS
Gordon	FC	RCEME School
Goss	RB	HQ 3 CIBG
Greenshield	W	4 CIBG
Griffin	GW	CFB Kingston (207 Wksp)
Grouette	JWP	1 R22R Maint Sec
Hass	DF	CFB Winnipeg (212 Wksp)
Halliday	AG	CFB Kingston (HQ 3 Coy)
Harper	JM	E Ont Dist Staff
Hasler	HJ	202 Wksp Depot
Haugen	RG	CFB Gagetown
Hennessey	RF	2 Fd Wksp
Henry	CR	CFB Chilliwack (216 Wksp)
Hewisson	RW	1 CIBG
Heximer	AM	CFB Chilliwack (HQ 11 Coy)
Hill	LJF	HQ Mat Comd AM/TM
Hooper	TC	CFB Winnipeg (HQ 10 Coy)
Hudson	PS	RCEME School
Hynes	BJ	2 RHC Maint Sec
Jermey	FW	RCEME School
Jodoin	LH	RCEME School
Johnson	RL	1 TPT CBUE
Johnson	WA	CFB Gagetown
Johnstone	T	CFB Montreal (4 Coy)
Kelly	M	CFB Calgary (215 Wksp)
Konzuk	A	1 Fd Wksp
Krupp	HH	3 R22R Maint Sec
Kutyik	J	CBUE
Lasuta	W	202 Wksp Depot
Lannan	FX	1 Fd Wksp
Leach	WJ	2 TPT CFB Petawawa
Lefebvre	R	202 Wksp Depot
Lewis	FA	CFB Esquimalt
Lewis	LH	202 Wksp Depot
Little	JE	DGOMC (DCER)
MacLean	CB	CADEE
MacLeod	D	Ld Mat Maint
Mandeville	E	CFB Valcartier
Manktelow	WO	Ld Mat Maint

Class 2 cont'd

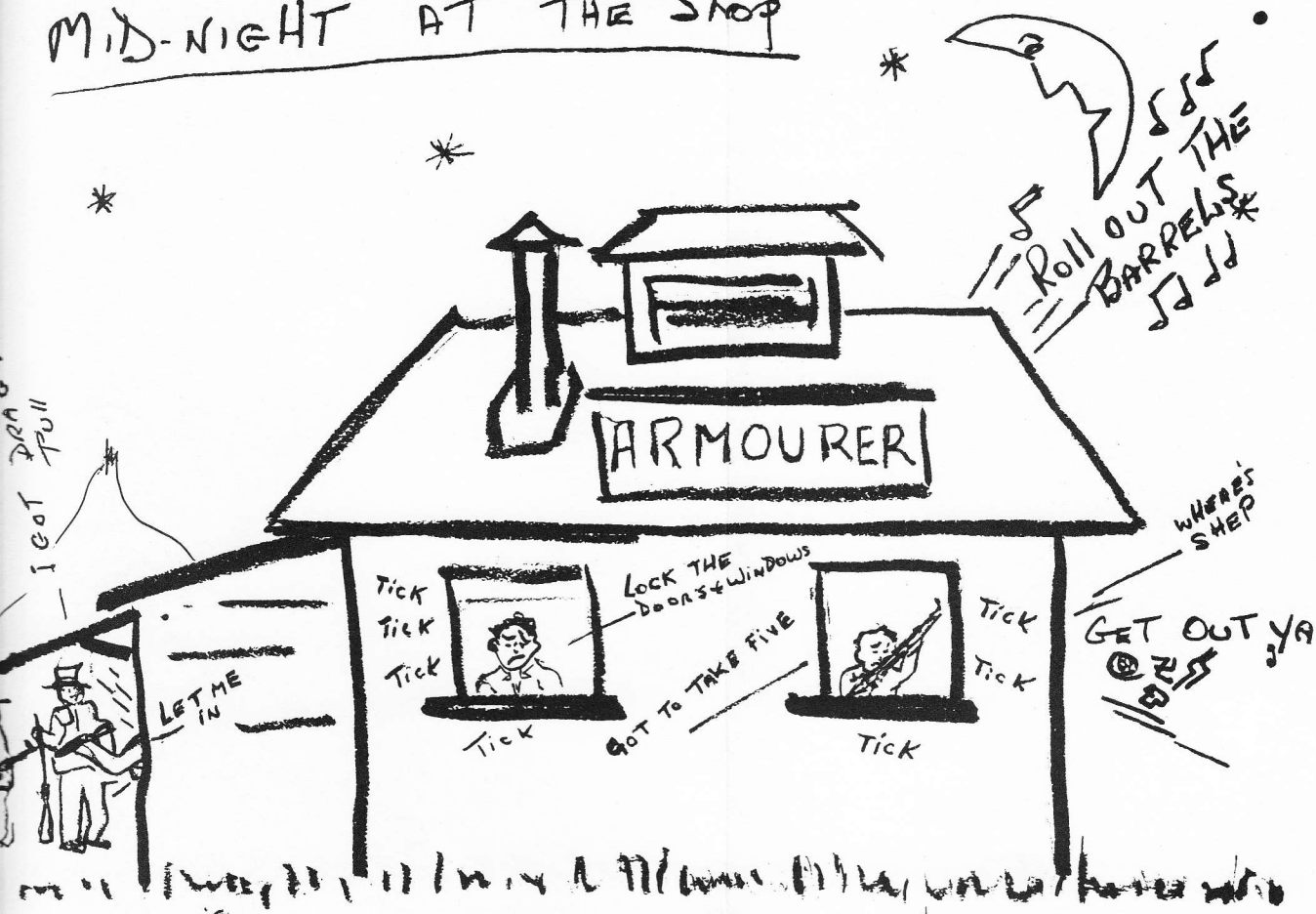
Mansfield	LA	Alta Dist Staff
Marin	EW	RCEME School
Mason	RAH	202 Wksp Depot
Maxell	AC	2 Fd Wksp
McCormack	CB	CFB Gagetown
McDonald	AE	1 RCR Maint Sec
McDonald	DW	Western Ont Dist Staff
McDow	KA	LETE
McIntyre	G	RCSA
McKee	AC	2 Fd Wksp
McLaughlin	WE	2 Fd Wksp
Measor	HD	2 RCR Maint Sec
Milne	HC	Ld Mat Maint
Monkman	WWB	RCEME School
Montgomery	DC	CFB Calgary (215 Wksp)
Moore	WE	Ld Mat Maint
Morton	R	Ld Mat Maint
Munday	AC	1 RCHA Maint Sec
Nelson	WJ	CFB Petawawa
Neudorf	I	HQ Man Dist Staff
O'Grady	CL	NS/PEI Dist Staff
Orme	JI	RCEME School
Palmer	MP	2 RCHA Maint Sec
Paradis	LA	3 R22R Maint Sec
Patterson	MP	9 Tpt Coy RCASC
Patterson	MV	BC Dist Staff
Perrier	LG	DPCA (RCEME)
Phillips	EW	RCEME School
Pineo	MC	LdSH (RC) Maint Sec
Pomeroy	VRC	Sask Dist Staff
Price	EC	27 COD
Quinn	WR	EBS Bn
Rabey	KO	DVFE
Reid	FL	202 Wksp Depot
Rhodes	AP	27 COD
Rodd	EL	CADEE
Ronan	JM	Ld Mat Maint
Ross	DA	4 Fd Wksp
Schussler	WD	CFB Toronto (2 Coy)
Sheldon	ND	202 Wksp Depot
Small	WF	UNEF ME
Snell	JC	CFB Borden (14 Coy)
Sparling	RE	CFB Esquimalt (HQ 11 Coy)
Spragg	WH	202 Wksp Depot
Squires	EH	2 QOR of C Maint Sec
St John	DA	HQ 3 CIBG
Stewart	GG	202 Wksp Depot
Starbo	RM	CFB Calgary (215 Wksp)
Suley	SDW	1 Tpt Hel Pl St Hubert
Summerfield	JW	HQ Trg Comd
Szekeres	JJ	202 Wksp Depot
Taylor	CE	Ld Mat Maint
Taylor	JF	1 Fd Wksp
Thibaudeau	AE	202 Wksp Depot
Thompson	GF	202 Wksp Depot
Thompson	TAE	202 Wksp Depot
Thoresen	RE	1 Fd Sqn RCE
Thorne	J	1 Fd Wksp
Tinnan	TJ	202 Wksp Depot
Totten	CR	NB Dist Staff
Trattles	EW	4 Fd Wksp
Trinca	JL	4 CIBG
Turner	AG	DGOS
Wallace	AE	Ld Mat Maint
Wencorf	BH	EBS Bn
Wild	EB	CFB Calgary (229 Wksp)
Wilson	ME	1 PPCLI Maint Sec
Wolfenden	R	202 Wksp Depot
Woodrow	JA	CFB Halifax (6 Coy)
Wright	EG	202 Wksp Depot
Wright	WF	HQ CBUE
Wright	WH	CFB Edmonton (224 Wksp)

(COMPUTERS continued from page 35)

The "Bochum experiment", which was carried out by the head librarian at Bochum University in conjunction with the Federal Republic of Germany's central computer centre at Darmstadt, has aroused much interest among experts, but even they were surprised when, at a recent international convention in London, the Director of the German Library in Frankfurt submitted the first booklets, dealing with German Bibliography, that had been compiled with the use of electronic data-processing.

These German library lists, which are issued weekly, provide book-sellers, librarians, scholars and other interested people with information on new publications in the German language, and the index of authors and titles greatly facilitates the hunt for publications. In recent years, the German Library had fallen behind with its bibliographical reporting, so two years ago a subsidiary of the Max Planck Society promised the Library it would investigate the use of electronic data-processing in its compilation of the German Bibliography.

MID-NIGHT AT THE SHOP



MY RIFLE IS HUNG UP - I NEED A PILL - GOT TO SEE DOC FOR A FIX

ICK YOUR
Alibi →

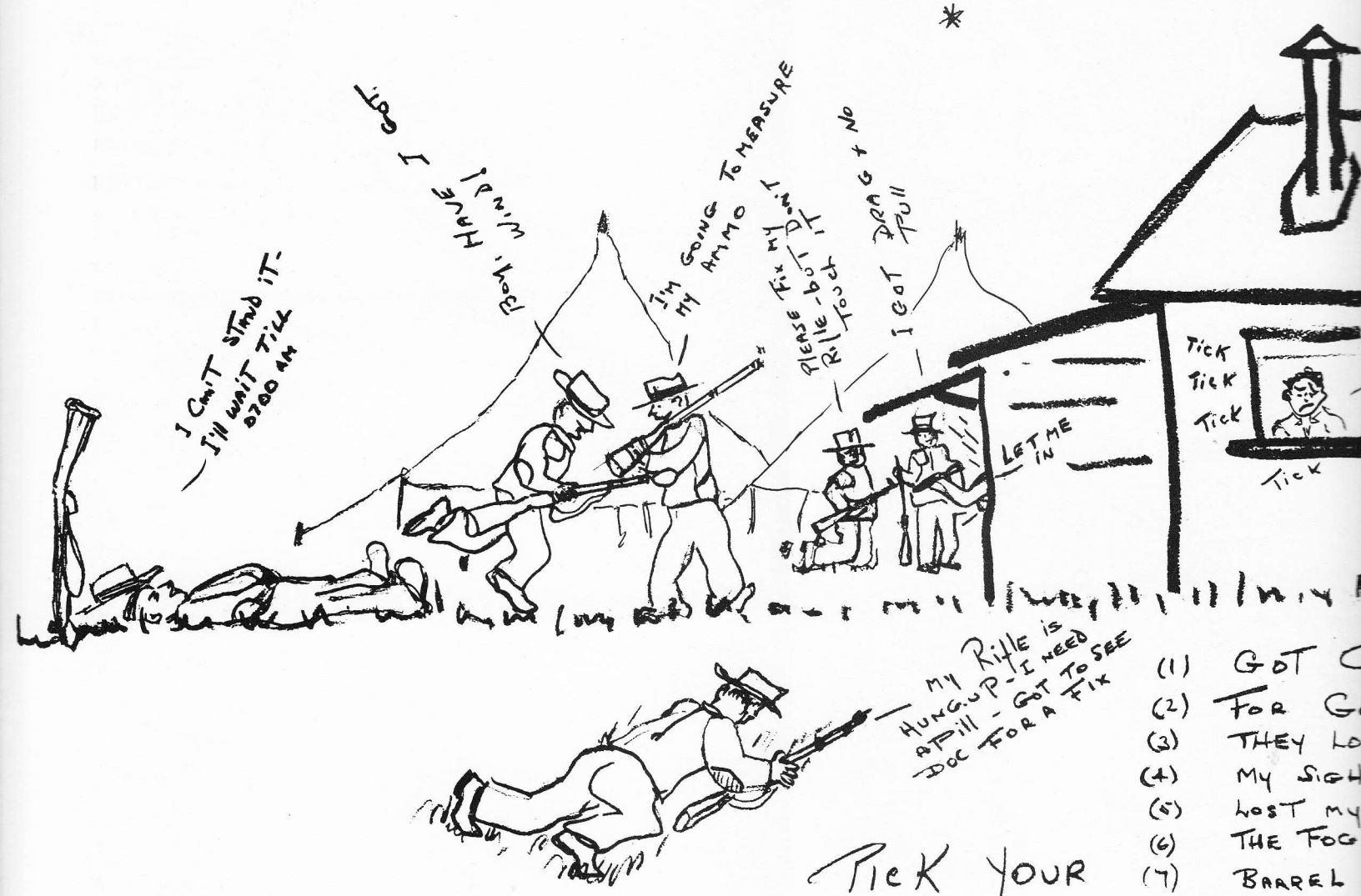
d by

TE

(1) GOT CAUGHT IN A HURRICANE
(2) FOR GOT MY SCOPE
(3) THEY LOST MY TARGET
(4) MY SIGHT WAS LOOSE
(5) LOST MY PULL
(6) THE FOG WAS TOO THICK
(7) BARREL WAS STICKING
(8) HANDGUARD FELL OFF
(9) TRIPPED OVER MY SLING
(10) GOT A TICK
(11) AMMO WAS TOO GOOD
(12) BARREL WAS BENT
(13) WIND WAS GOING THREE WAYS AT ONCE
(14) FLAG POLE YOU WERE LOOK AT BROKE
(15) BORROWED A RIFLE FROM TED WRITE
(16) RALPH HAD NO TIME TO FIX IT
(17) O'ROURKE DID NOT COME THIS YEAR
(18) COPPER IN THE BARREL
(19) I HEARD SOME BODY SAY FIFTEEN MINS AND I MISS
(20) MY GLASSES WERE FOGGED UP.
(21) SOME BODY SAID "MAGPIE" AND YOU KNOW WHAT HAPPENED

By Bill Ryan

MID-NIGHT AT T



Tick Your
Alibi →

(1) GOT C
(2) FOR G
(3) THEY LO
(4) MY SIGH
(5) LOST MY
(6) THE FOG
(7) BARREL
(8) HANDGU
(9) TRIPPED
(10) GOT A T
(11) AMMO W
(12) BARREL
(13) WIND WA
(14) FLAG PO
(15) BORROWE
(16) RALPH H
(17) O'ROURKE
(18) COPPER I
(19) I HEARD S
(20) MY GLASSE
(21) SOME BOD

NB: HAVE YOUR Rifle BEDDED by
"TED RITE" IN CONCRETE
"GUARANTEED" NOT TO MOVE